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The JOURNAL-LANCET

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SPECIAL PUBLIC HEALTH NUMBER

RUTH E. BOYNTON, M.D.
Guest Editor

Dedicated to Francis Edward Harrington, M.D.

A Personal Appreciation

and papers on

Epidemiology of Poliomyelitis
Immunization against Pertussis
Control of Influenza
Cancer Control
Diphtheria in Minnesota
Tropical and Exotic Diseases
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Foreword

Haven Emerson, M.D.*

New York City

Results, calculable with almost mathematical precision, can be predicted from the intelligent and consistent application of the resources of immunology and the lessons of epidemiology by the private practitioner of medicine among his clientele and by the exercise of the authority and educational resources of the local and state health departments for the control of the communicable diseases.

To the successes of the past seventy-five years, built upon the basic experiments of Pasteur, are due most of the credit, prestige and popular faith and confidence in official health services, such as separation of the sick from the well, abatement of sources of infection and the facilitation of universal vaccination and other procedures of immunity or of measures to distinguish between susceptible and immune persons.

In this field are our quotable triumphs, and it behooves us to avoid the temptation of promising similar achievement in some other categories of preventable disease. Even among the communicable diseases, let honest modesty admit our unsuccess with the "common cold," virus, bacterial viroid or other, with syphilis and gonorrhea, with poliomyelitis and with influenza, except in a narrowly restricted sense.

Substantial merit or statistical proof of benefit cannot be claimed unequivocally for many of the more recently attempted functions of health departments, whether of state, big city, or rural county.

Among the popular brands of public health promotion, notification, education, voluntary fund-raising and organization, are those directed at cancer "control", diabetes, heart disease, rheumatic fever, all to be "controlled" along with pneumonia, caries of the teeth, avitaminosis and personality deviations, not to mention feeble-mindedness and schizophrenia.

The very fact of widespread prevalence of a kind of illness or a cause of death does not warrant us in clamoring for public money and effort when prevention is still in the minds of hopeful idealists rather than a project to tempt the public officer to sound action.

Where pneumonia death rates have fallen, it is because physicians have been surer and quicker in diagnosis and more resourceful in the use of chemotherapy and biotics. Where cancer and diabetes rates are lower, this is the result of better medical and surgical service by individuals and hospital groups, not of any substantive action by health departments. There is yet to be recorded any evidence that by taking thought of a way of life any person has escaped acute rheumatic fever or death from senescent or arteriosclerotic heart disease.

We eat what we choose or must, not according to the National Research Council. Prevention of caries is still a secret, though whisperings are heard.

Information is wholesome for the mind, but "public health education" often rings hollow in the ear because solid facts are still lacking to motivate personal conduct.

Broaden the scope of public health by all means, honestly, modestly, but let us not betray our public by campaigns that promise what we cannot perform.

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*Professor Emeritus, Columbia University.

Francis Edward Harrington Physician, Administrator and Benefactor of Man

A Personal Appreciation

by
J. Arthur Myers, M.D.
Minneapolis, Minnesota

Through the special effort of the late Dr. Mabel Ulrich and others, the Board of Public Welfare appealed to the United States Public Health Service in 1919 for aid in reorganizing the Division of Public Health in Minneapolis. Dr. F. E. Harrington was directed to this duty, which he assumed on January 1, 1920. The record showed that he was born in Norfolk, Virginia, on June 19, 1879. His father was Francis Henry Harrington, Brigadier General of the United States Marine Corps, and his mother, Sarah Rosa Callan Harrington. His paternal grandfather, George Harrington, was Assistant Secretary of the Treasury during Lincoln's first administration. When Francis was two years old his parents moved to Washington, D. C. There he entered the parochial schools in 1887 but transferred to public grammar school (Charleston) in Boston, Massachusetts, in 1892. From the latter school he received a certificate of graduation in 1895. The next year he entered the Charleston High School in Boston, but after one year returned to Washington and registered in Gonzaga High School, graduating in 1899. He entered the School of Medicine of Columbian University, now George Washington University, in the fall of 1899 and received the degree of Doctor of Medicine in 1904. There he worked under Major Walter Reed and Captain James Carroll of yellow fever fame. After completing two years in the sciences, Gonzaga College granted the degree of Bachelor of Science in 1906. Seven years later this college conferred the degree of Doctor of Law (Honoris Causa). From 1902 to 1906 he was resident interne, assistant and associate in the dispensary service at the Eastern Dispensary and Casualty Hospital in Washington.

Following graduation Dr. Harrington practiced medicine in Washington and was medical inspector of the District of Columbia until 1910, when he became whole-time health officer of Cumberland, Maryland, where he was also licensed to practice medicine. His work attracted the attention of the United States Public Health Service, and in 1914 he accepted a field duty position as assistant epidemiologist. This included surveys and reorganization of health departments in at least nine states.

In January, 1917, Dr. Harrington was appointed whole-time health officer of Jefferson County, Alabama. The same year he was ordered to active duty in the Public Health Service incident to World War I. He proceeded to the McClellan military training camp zone (Alabama) and later to Camp Shelby in charge of control of communicable diseases in cooperation with the army medical officers. Following the armistice he was assigned to shipyard sanitation duty and later to survey work of city health departments. In February 1919 he was promoted from assistant to epidemiologist and was commissioned surgeon in the United States Public Health Service.

Dr. F. E. Harrington

Obviously from this large experience he was highly qualified to direct the health activities of Minneapolis. He was young, handsome, immaculately groomed, ambitious, vivacious, energetic, and, above all, had a vision which enabled him to perceive the day, although afar off, when scourges such as diphtheria, pneumonia and tuberculosis would be overcome. In fact, he fully expected to see much of this accomplished in his own lifetime. These fine qualifications placed him in the front rank as a leader.

Dr. Harrington's initial appointment was for one year for the express purpose of effecting reorganization. At the end of the year the appointment as Commissioner of Health was reaffirmed without limitation. One of the requirements for this new position was a license to practice medicine in the State of Minnesota. Therefore, Dr. Harrington took the examination and was licensed in October 1922. He was registered under the Minnesota Basic Science law in July 1927. The Board of

Public Welfare was charged with the duties of enforcing the state laws and the city ordinances relative to the suppression and prevention of diseases in the city. At that time severe epidemics were not uncommon. Dr. Harrington and his co-workers exerted every possible effort to prevent such epidemics by suppressing outbreaks at their beginning. A vast amount of educational work was done and proved immunizing agents were recommended everywhere. A good example of the effectiveness of these control measures is to be found in diphtheria. In 1920, 1921 and 1922 the numbers of cases reported were 649, 1452 and 1275, with 45, 54 and 50 deaths, respectively, whereas, in 1940, 1941 and 1942 these were 64, 31 and 37 cases, with 3, 1 and 0 deaths, respectively. During the last several years of Dr. Harrington's term of office it was not unusual for months to elapse without a single case of diphtheria on record. There were 283 cases of typhoid fever from 1920 to 1922, but only 33 from 1940 to 1942, inclusive.

Dr. Harrington worked in close cooperation with the medical profession as he thoroughly realized its members are a potent force in public health control. Immunizing projects were always placed in the hands of the County Medical Society. To cite one example: In 1936 he arranged for funds for immunization through the Board of Public Welfare. This money was made available to the Hennepin County Medical Society to compensate private physicians. Indeed, no important activity was ever undertaken without first consulting with the proper committees of the Hennepin County Medical Society. Dr. Harrington has always been of the belief that as many people should be put to work as quickly as possible on any given project. He frequently quotes Kipling:

> "It ain't the guns nor armament
> Nor the army as a whole,
> But the everlasting teamwork
> Of every bloomin' soul."

In May 1938 an outbreak of canine rabies occurred. On May sixth Dr. Harrington and C. E. Cotton, of the State Livestock Sanitary Board, issued a proclamation for the muzzling of all dogs in the city. Certain persons protested vigorously, many of whom were among the anti-scientific group that denied the existence of such a disease as rabies. Within a week some of them even threatened the life of the Commissioner of Health. Although the Police Department deemed it wise to station officers in and about his home, Dr. Harrington's undaunted courage never waned. He went about his work as usual. Most citizens and civic groups rallied to his support. Rabid or suspicious dogs exposed or bit 212 persons. Anti-rabies treatment was accepted by the majority and not a single case of human rabies developed.

While serving as a junior interne in the Minneapolis City Hospital, Superintendent Walter E. List called me to his office and discussed Dr. Harrington's unusual vision of tuberculosis control. He later arranged for a staff appointment on his tuberculosis service and urged that a meeting be held with Dr. Harrington to discuss the various problems pertaining to tuberculosis, as he believed the work of the General Hospital should be closely correlated with that of the Division of Public Health. In February, 1921, Dr. Harrington came to my office and stated that a careful survey of the health of Minneapolis citizens had convinced him that tuberculosis constituted the most serious problem. He had recently been appointed Director of School Hygiene and was working on a project whereby the Division of Public Health and the Department of Education would cooperate in the establishment of a school for tuberculous children. A building had been constructed on property donated to the city by the Lyman family and was therefore named Lymanhurst. Dr. Harrington had convinced the Board of Public Welfare to make this building available, and the School Board to equip it as a school and provide for instruction. Several tuberculous children whom he desired to have educational opportunities were on the Health Department records, since they were not permitted to attend regular schools. Of equal importance was a well organized study of tuberculosis among children. He desired answers to such questions as: (1) What percentage of children is infected with tubercle bacilli? (2) How and where do the infections occur? (3) Is it better for a child to enter adulthood with or without tuberculous infection? (4) If it is preferable not to be infected, what can be done to protect children against tubercle bacilli? (5) What happens to children infected in the various years of infancy and childhood while they are children? (6) What happens to infected children after they attain adulthood ? (7) What happens to individuals who pass through childhood without infection but become contaminated with tubercle bacilli during adult life? Although many theories and opinions were extant, the medical literature contained no reports of well controlled studies. He stated that opportunities and facilities would be made available to a group of physicians who were willing to conduct studies in an attempt to produce answers to his many questions. Such knowledge as he desired was imperative if tuberculosis were to be controlled.

The opportunities he offered for study seemed unbelievable; yet he was sincere and the positions he held would enable him to carry out a worthwhile project. What he especially desired was a medical staff that would have sufficient interest, vision, tenacity and investigative spirit to undertake this long-term project. No fund was available to pay physicians. A few days after his visit to my office in February, 1921, the following letter was received from Dr. Harrington: "It is with pleasure that I offer you the position of Medical Director and Chief Consultant with me as Hygiene Director of the Board of Education for studies at Lymanhurst. The position is without salary and will be effective from the date of your acceptance." Among the physicians approached concerning work at Lymanhurst, not one failed to manifest enthusiasm. A group was selected who represented every phase of medicine and Dr. Harrington appointed them as staff members. On May 31, 1921, the work began. Ninety-eight Minneapolis physicians participated actively in this tuberculosis project, while more than 200 others from this and other countries presented papers at staff meetings. No medical staff ever received finer support and direction than Dr. Harrington afforded the

Lymanhurst group. Annual reports were prepared, printed and bound with reprints of articles published by the staff members during the years. Literally hundreds of articles were published by the staff members.

As the years passed, answers were produced for most of the questions Dr. Harrington posed in 1921. The belief was then extant that nearly all children became infected prior to the age of fifteen years. Actual testing, however, revealed that less than 50 per cent of the Minneapolis children were infected with tubercle bacilli. To protect children necessitated the creation of an environment for each child that was free from liberated tubercle bacilli. This meant (a) providing enough sanatorium beds so all contagious cases could be removed from their homes and communities; (b) adopting or establishing methods of treatment that would prevent contagion; (c) supporting the pasteurization ordinance and aiding the veterinarian in his eradication program of tuberculosis among animals.

In 1921 it was believed that the individual who did not develop primary tuberculosis (tuberculous infection) during childhood had no immunity when adulthood was attained, after which infection would result in highly fatal forms of the disease. However, observation proved that adults who become infected for the first time tolerate the primary type of tuberculosis in the same manner as children, and subsequently they are no more likely to have chronic reinfection type of disease than those who were infected as children.

Some other facts established through this project were: (1) The tuberculin test is the most delicate and accurate phase of the examination for tuberculosis. Tuberculin reactions closely coincide with carefully performed postmortem examinations but with no other phase of the examination of the living body. This reaction indicates the presence of primary tuberculous lesions containing living tubercle bacilli with well known but unimportant exceptions. Therefore, there is no dividing line between tuberculous infection and disease.

(2) Children under the age of fourteen years, even though they react to tuberculin, so rarely develop the chronic reinfection type of pulmonary tuberculosis in contagious form that it is not necessary to make X-ray inspections of their chests.

(3) Nearly all contagious pulmonary tuberculosis occurs in adulthood. Therefore, contagious cases must be sought among adults.

(4) X-ray inspection of the chests of adult tuberculin reactors often reveals evidence of gross reinfection type of lesions long before symptoms are present or signs can be elicited by other phases of the examination. Every adult tuberculin reactor, regardless of apparent good health, should have periodic X-ray film inspections of the chest. If and when a shadow appears the examination should be completed to determine whether it is tuberculous.

(5) The primary type of tuberculosis (tuberculous infection), whether it occurs in the child or the adult, is not benefited by the present forms of treatment such as sanatorium care. However, all such children should be protected against exogenous reinfection and should be examined at least annually after they attain adulthood. Active reinfection type of tuberculosis, wherever it occurs in the body, should be carefully observed or treated at once.

As fast as facts were established they were put into practice. In 1922, when tuberculosis was rife among teen-age girls and boys in Minneapolis, Dr. Harrington promoted an X-ray survey of the chests of high school students. This was intended as a demonstration to show that X-ray inspection of the chest should be a part of every examination for tuberculosis among adults. Because he was nearly a quarter of a century in advance of the time the survey was greeted with fierce criticism. Some opposed it by stating that symptoms are always present to indicate the existence of tuberculosis, while others maintained that they could detect evidence of tubercuolsis more readily with their stethoscopes. The opposition was so great that only a small percentage of the 2,000 students reported for X-ray films in the first high school selected. His ardor was not dampened. He turned to his medical staff and said: "Continue to compile evidence. We shall use it sometime."

In 1923 another innovation was instituted in Minneapolis when Dr. Harrington trained public health nurses to administer the tuberculin test. This met with considerable opposition from those who believed that only physicians should use the hypodermic syringe. However, his wisdom was borne out and today public health nurses administer most of the tuberculin tests in many parts of Minnesota and in other states.

In the fall of 1924 Dr. Harrington believed a statewide organization of tuberculosis workers should be formed for the purpose of exchanging views and promoting a coordinated program. He requested that a committee of the Lymanhurst staff be appointed to meet with him. It was the consensus of this committee that Dr. Harrington's proposal was excellent and should be considered by others. Therefore, a representative group of physicians, including several sanatorium superintendents, was invited to attend the next meeting. There was unanimous agreement that such an organization should be effected, and in 1925 the Minnesota Trudeau Society was organized. The large number of members who now enjoy the benefits of this fine organization are indebted to Dr. Harrington for its inception and organization.

The Lymanhurst project proved the efficaciousness of the tuberculin test so conclusively that in 1930 Dr. Harrington requested all physicians to report to the Health Officer those persons who had no evidence whatsoever except the tuberculin reaction, as well as those who had demonstrable clinical disease. He wanted a list of all tuberculin reactors so his epidemiologists could seek the source of their infection and so all who had attained adulthood could be examined periodically. This innovation was at least twenty-five years in advance of the time. However, it must be adopted everywhere in the final round-up of tuberculosis.

An arrangement was made whereby all known or even suspected cases of tuberculosis who were incorrigible and recalcitrant were picked up by officers and taken to the General Hospital for confirmation of diagnosis. When contagion was found, the county commissioners committed the patients to the sanatorium, where they remained until the staff released them as free from contagion.

A campaign was instituted to examine all pregnant women, their husbands, and others who would frequent homes after children were born. This resulted in finding many unsuspected cases of tuberculosis to the benefit of the patients themselves and spared many an infant the hazard of infection with tubercle bacilli.

Dr. Harrington directed his epidemiologists, who were public health nurses, to work with physicians and seek out contagious cases among adults everywhere and to teach them how to control the dissemination of tubercle bacilli until they could be admitted to the sanatorium. He urged physicians to report promptly all cases of tuberculosis so the public health aspects could be given immediate attention.

He instituted another innovation in 1932, when he officially presented health certificates to student nurses at their graduation exercises. The certificate indicated that the nurse had been immunized against the diseases for which there are satisfactory immunizing substances and that she had been tested with tuberculin, and if a reactor, had been completely examined, including X-ray film inspection of her chest, so that at the time of graduation there was no evidence of contagious disease. In his presentation addresses he advised these nurses to keep their certificates to date as the years passed. By so doing, he assured them they could avoid catastrophes such as he had seen in nurses developing unsuspected contagious tuberculosis and infecting large numbers of other persons.

In 1933, Dr. Harrington convinced the Board of Education to conduct a survey of its 3,600 employees in order that all persons with tuberculosis requiring treatment might be discovered and those with contagious disease might be removed from the schools. This was among the finest tuberculosis surveys ever completed in this country.

He personally conducted a tuberculosis survey among elderly persons, as he was convinced that many unsuspected but contagious cases existed in this age period. This included 975 persons of 55 years or older who had never had diagnoses of tuberculosis. Tubercle bacilli were recovered from the sputum of approximately 9 per cent.

For the treatment of tuberculous children a day school was provided with a capacity for 175. Hospital beds were also available for those too ill to be in school. However, the medical staff recommended that the wards be discontinued in 1926 because it was thought that any child sufficiently ill to be in bed should be in a regular hospital or a sanatorium. Moreover, after observing the effects of treatment of children with primary type of tuberculosis for thirteen years the fact was established that those who had been sent to a sanatorium had not benefited more than those in the special school, and those in the latter institution were no better off than the children with the same conditions who had remained at home. Therefore, Dr. Harrington closed the school in 1934 and diverted the funds for use in testing more children with tuberculin and examining adults for the reinfection type of tuberculosis.

When the school was closed, the vacated space was devoted to study and care of children with rheumatic fever and various heart lesions. Forty beds were made available for such cases, under the medical direction of M. J. Shapiro.

Beginning in 1937, in cooperation with the County Medical Society and the County Tuberculosis Society, Dr. Harrington has provided free tuberculin in dilutions ready to administer and which was periodically delivered to the office of every physician. Approximately 20,000 vials have been prepared for this purpose annually. This resulted in the finding of many unsuspected cases of tuberculosis among persons who reported to their doctors for entirely different reasons.

When Dr. Harrington became Supervisor of the Minneapolis General Hospital in 1937, he arranged for the tuberculin testing of every admission; X-ray film inspection of the chests of reactors, and complete examination of those who presented shadows which might be due to tuberculosis. This became a part of a similar program which Dean H. S. Diehl and Superintendent R. M. Amberg had instituted at the University of Minnesota Hospital in 1936. In both institutions members of personnel also had the same examination as the patients. Prior to this time large numbers of students of nursing and medicine had become infected in these hospitals, and not a few developed clinical tuberculosis. This program had a profound influence on the control of tuberculosis among the students.

He then established a special tuberculosis service in the contagious disease building, where persons found to have tuberculosis coexisting with the condition for which they were admitted are immediately transferred. Moreover, anyone found to have contagious tuberculosis, hemorrhage, etc., in the city is immediately isolated here, pending admission to the sanatorium. This is also a differential diagnostic center. A good many persons are admitted whose lesions prove to be nontuberculous. He ordered a contagious disease technique as strict as that employed on the diphtheria and typhoid fever services in order to protect personnel, visitors and other patients, which was so effective that the tuberculous infection attack rate among student nurses on the service was markedly reduced. This service attracted so much attention that one of its published reports received a Modern Hospital award of merit in 1943.

Thus, the project which Dr. Harrington instituted in 1921 resulted in the establishment of fundamental facts which completely revolutionized tuberculosis work and replaced the opinions of 1921. Thereafter, practical and scientific control programs went into effect, and the accomplishments were spectacular. Where 120 persons died per 100,000 population in 1920, only 24 died in 1942. If the mortality rate of 1920 had continued in the city of Minneapolis, there would now be 600 deaths annually instead of about 125. While approximately twenty children from birth to five years died annually in the early twenties, not a single death occurred in this age period in 1945.

There has been such a decline in morbidity that while there was clamoring for beds in sanatoriums in 1926, large numbers of the same beds were vacant in 1944. Where 47 per cent of grade school children had primary tuberculosis (tuberculous infection) in 1926, only 8 per cent had this disease in 1944. The tuberculous infection attack rate among children up to six years was more than 3 per cent per annum in 1926, but was only one third of one per cent per year in the early 1940's. Under Dr. Harrington's leadership tuberculosis has reached such low ebb in Minneapolis that tuberculosis workers are beginning to talk about eradication rather than control of the disease.

In the Lymanhurst building other health activities were soon added, such as a dermatology clinic conducted by the late John Butler, a venereal disease clinic, first under the direction of David Ellison and later Wale Wright, an orthopedic clinic in charge of Paul Geissler, and a cardiac clinic directed by M. J. Shapiro. It was this cardiac clinic, begun by Dr. Harrington and Dr. Shapiro, which later led to funds through the Variety Club and the University for the construction of a hospital on the Medical School campus for patients with cardiac conditions.

Dr. Shapiro writes: "While I worked with Dr. Harrington for more than twenty years he was always willing and anxious to help in my plans to build up a system of adequate care for children with heart disease. It was only through his guidance and vision that cooperation was obtained from the various civic organizations.

"Dr. Harrington was progressive, willing to listen to new ideas, and, if convinced, was most effective in getting things done. I always found him fair, and willing to give the other fellow credit for accomplishments. He deserves a great deal of credit for the important work which finally developed into the building of the new Heart Hospital. He served the city well as director of health activities, not only for the general public but also for the school children of the city of Minneapolis. I shall always have the deepest affection for him."

Dr. Wright says: "It gives me real satisfaction to express my respect and admiration for Dr. Harrington, both as a fine man and as health commissioner. During nine years of work under his direction I came to know him well—so well in fact that I never expressed my true feeling to him because he was too keen to be impressed with what he might mistake for flattery.

"While working *with* Dr. Harrington and not for him, two characteristics were outstanding. First, his ability to be accessible when he was asked to solve a difficult situation. During conferences he always gave my opinions honest consideration and did not come with a previously decided plan of action. If he thought my decisions were wrong, he offered better plans of action. The second characteristic was the way he trusted his employees with their own work. This gave each of us a sense of responsibility and we were assured of his silent approval. Thus, we were happy and satisfied in our work, which never became monotonous and unpleasant routine. Dr. Harrington had the happy facility of making us find pleasure in our daily work.

"Since I have no 'axe to grind' and 'no apples to polish', Dr. Harrington must now accept these statements as my sincere and honest feelings toward him."

Thus, the Lymanhurst building became a health center. Dr. Harrington devoted a large amount of energy and time during the best twenty years of his life to its development. It became one of the finest to be found anywhere in the nation and was internationally famous, attracting visitors and students from all over the world. He regarded this as his greatest accomplishment—it was the pride of his life.

When the Lymanhurst Health Center had reached the height of its development and was rendering service to thousands of persons in the city of Minneapolis, Elizabeth Kenny, who had done some work in physiotherapy for poliomyelitis cases in Australia and England, arrived and propounded certain concepts concerning this disease. Dr. Harrington convinced the Board of Public Welfare that she should have an opportunity to demonstrate her work at the Minneapolis General Hospital. Soon thereafter, a group of her followers insisted that an institute be set up under her name. Dr. Harrington supported this project, and various buildings were located and offered for this use. She considered none of them adequate. Lymanhrust was the only building that was pleasing to her, and over the most strenuous protests of Dr. Harrington, this world famous health center was taken from him in 1942, and all of the services to which he and hundreds of other physicians and nurses had devoted so much of their valuable time were dispersed except one small cardiac clinic. One wonders if any man ever received a more severe blow.

During the year 1942, when the activities of the Lymanhurst Health Center were dispersed, there were 2,506 cases of reinfection type of tuberculosis on the Division of Public Health records and 116 deaths. The same year 1,546 cases of venereal disease were reported. Heart disease was the first cause of death. That year there were nineteen resident cases of poliomyelitis with no deaths and fifteen non-resident cases were imported for treatment.

After a time the Kenny Institute was released by the city and has since been operated by a private organization. The board members of the new organization must have recognized the great injustice that had been done Dr. Harrington. They also knew of his powers as an organizer and hospital director. Therefore, upon retirement from the supervision of the Minneapolis General Hospital he was offered the superintendency of the poliomyelitis institute. His loyalty to public health and the good of mankind could never falter. For some time he pondered over the proposal and conferred with his friends. Finally he accepted because he saw the possibility of developing a medical organization which might be acceptable to the School of Medicine of the University of Minnesota and the medical profession of America. He worked diligently trying to enlist the interest, support and activities of those who are experts in the various phases of poliomyelitis. However, the concepts in vogue at the institute were contrary to long-established facts regarding the disease. Physicians were interested, not in concepts contrary to facts, but in using those that had been well established and searching for more of them by scientific rather than empirical methods. No opportunity appeared to institute a truly scientific research program. Not a single physician would join the staff. In March, 1946, he tendered his resignation as superintendent of the poliomyelitis institute. However, he was prevailed upon to remain a little longer, but on Sunday morning, May 5, 1946, while riding to church in an automobile, he had a hemorrhage which totally incapacitated him.

After C. E. Remy resigned the superintendency of the Minneapolis General Hospital in 1937, Dr. Harrington was directed by the Board of Public Welfare to assume supervision until a superintendent could be procured. With this additional work he resigned as Director of Hygiene of the Minneapolis Public Schools. From May, 1937, to January 1, 1939, he served both as Commissioner of Health and Director of the General Hospital. Immediately after assuming the supervision of the hospital, he called a meeting of the chiefs of staff and informed them that each one would be in absolute charge of his service, and each chief would be directly responsible to him for all the activities of his service. He emphasized that nothing would be done on any service except on recommendation of the chief. Every possible effort was made to provide adequate personnel and all necessary equipment for the efficient operation of the entire hospital. Although the supervision of the hospital was in addition to his duties as Commissioner of Health, he accepted no additional compensation from the Board of Public Welfare.

When D. W. Pollard became superintendent in January, 1939, Dr. Harrington's work was greatly lightened. However, when Dr. Pollard left for military service in August, 1942, Dr. Harrington was directed to take charge of the hospital during his absence. After reaching the retirement age as Commissioner of Health in June, 1944, a special provision was made, whereby he continued as director of the hospital until Dr. Pollard returned in April, 1945.

Dr. E. T. Bell, Chief of the Department of Pathology at the Minneapolis General Hospital, says: "In his long career as Health Officer of Minneapolis, Frank Harrington always exhibited a high quality of courage. He did what was best for the public health without regard to political consequences. He was an able and efficient health administrator. When he was Acting Superintendent of the Minneapolis General Hospital from May 1937 to January 1939, and again during the war in Dr. Pollard's absence, he did an excellent job of administration. He worked for the best interest of the patients and the staff. He was indeed a popular superintendent. Dr. Harrington has many friends among physicians who admire an honest and fearless public official."

Dr. Harrington has always been a staunch supporter of the nursing profession. Those who were engaged in the Division of Public Health and the School Hygiene Department found him supporting their activities to the nth degree. Miss Elizabeth Sprague, who for many years directed the work of public health nurses at Lymanhurst, says: "During my long and close association as an employee under the direction of Dr. Harrington as Commissioner of Health, I had occasion to observe certain outstanding characteristics. Among these were his broad mental vision, his alertness, his undeviating adherence to high standards, his unselfish objectives, his decisiveness of action and complete honesty; always kind, generous and understanding.

"I remember well the fairness of Dr. Harrington in dealing with irate citizens who now and then came to his office to protest against some official action which they felt was unjust interference with their private business. His patient, unhurried explanations left them, in most instances, convinced and satisfied that the action taken was made mandatory under the law and unavoidable. Following such interviews the departing note was almost invariably one of friendliest good will.

"In times of peace Dr. Harrington was happy; in turbulence he still had a joyous way of rising above the storm clouds into the sunlight of victory. His wide knowledge, Irish humor, and seemingly inexhaustible reserve of good stories made conversation with him a delightful experience. Dr. Harrington's interest in the tuberculosis problem was evident from the time he arrived in Minneapolis and discovered the needs. The value of his contribution to this important cause during the intervening years is inestimable."

Miss Cora Helgeson, who was in charge of the activities of school nurses for seventeen years while Dr. Harrington was Director of Hygiene says: "From 1920 to 1937, while Dr. Harrington served as Director of Hygiene in the Minneapolis Public Schools it was my great privilege to work with him as Supervisor of School Nurses. Here I learned to appreciate his rare qualities. Our problems were less trying because of his intelligent understanding of them and of us. His sense of fairness so evident in all relations with coworkers instilled a loyalty which is fitting tribute to him. Through his remarkable administrative ability the efficiency of the Department of Hygiene was greatly advanced.

"Dr. Harrington's personal charm, spontaneous wit, loyalty to his associates, honesty and many other rare abilities won the esteem and high respect of all who know him."

While supervisor of the Minneapolis General Hospital he was convinced that the quarters for nurses should be enlarged and improved. Therefore, he set to work to procure funds which resulted in the addition of five stories to the Nurses' Home and additional equipment to make it most modern. Following the dedication of this addition the medical chiefs of staff prevailed upon the mayor and the Board of Public Welfare to name the nurses' building, Harrington Hall.

As a teacher Dr. Harrington has unusual ability. He did much individual teaching. The poor and rich alike who had health problems of any kind were free to go to his office for brief or lengthy discussions. He was never too busy to speak before large or small groups, and literally addressed hundreds of organization meetings.

Beginning in 1938, he presented a long series of radio broadcasts on health. For several years he gave a course of lectures to the senior students of several schools of nursing. Over a period of approximately twenty years considerable teaching of medical and graduate students at the University was done at the Lymanhurst Health Center. Research grants were made by the Graduate School and a sizable group of medical articles and several books were prepared and published from this material. In all of this Dr. Harrington actively participated. In 1938 he was appointed Clinical Professor of Public Health in the School of Medicine at the University of Minnesota, a position which he still holds. His lectures were most instructive and were greatly appreciated by the students.

Dr. H. S. Diehl, Dean of Medical Sciences of the University of Minnesota, says: "It has been my privilege to work with Francis Harrington over a period of more than twenty years. Our mutual interests and responsibilities covered the control of communicable diseases among University students, teaching in public health and finally the administration of the Minneapolis General Hospital. In these various relationships Dr. Harrington was always friendly, cooperative and effective in getting things done. Our Medical School, our School of Public Health and the University in general, as well as the city of Minneapolis, owe Dr. Harrington a debt of gratitude for the contributions which he has made to the improvement of public health and medical service in this community. We have been proud to have him as a member of our faculty in Public Health and regret that 'Father Time' caught up with him and compelled his retirement."

Prior to coming to Minneapolis Dr. Harrington had published several articles on such subjects as typhoid fever and malaria. While in Minneapolis his annual reports were prepared with great care and contain a large store of information. Over a considerable period of time he prepared a column on public health for the Minneapolis Sunday Tribune. During the past twenty years he contributed articles on tuberculosis and other subjects to local and national medical journals.

In all of his work his secretaries, first, Mrs. Laura Baxter Dickson, and, later, Miss Edith Johnson, played important roles. Concerning him Mrs. Dickson says: "It was my privilege to work with Dr. Harrington as his secretary for eleven and one-half years when he first came to Minneapolis. The day he arrived I was relieving the information clerk in the front office, when a very vivacious person in full military uniform, spurs and all, appeared at the counter. He waited his turn, and then said, 'I am Dr. Harrington, your new Health Commissioner.' In a short time we all knew him well. As a leader and organizer he was unexcelled. He was extremely witty and had a keen sense of humor. He had the admiration and respect of all who worked for him, and was considerate of everyone. He started each day with a cheery 'Good Morning' to all.

"One of the first things Dr. Harrington did was to discourage the theory that the burning of sulphur candles for fumigation after a contagious disease was of any value. For this he received the congratulations of many health commissioners throughout the country. It was indeed an inspiration to work for a man with the high ethical standards he displayed by continually refusing to let his name and position be used for the endorsement of commercial products, in spite of the lucrative offers made him on many occasions. He was extremely conscientious and faithful to his profession and his official duties. His work in Minneapolis will long be remembered."

Miss Johnson writes: "To describe a truly great person is to describe Dr. Harrington. This feeling, I know, is shared by the persons who worked with him and under his direction as Commissioner of Health of Minneapolis. It is difficult to tell briefly the qualities that make him an outstanding public health officer, a successful administrator, a true friend; but those of us who were privileged to work with and for him are deeply aware of these qualities and feel that our lives have been enriched because of our association with him. He is a person who will always be held in highest esteem and deepest affection."

Dr. Harrington holds membership in a large number of medical organizations, such as the County, State and American Medical Association, International Society of Medical Health Officers (first president), Association of Military Surgeons, American Association of School Physicians (director), American Public Health Association (councilor), American College of Physicians, National Tuberculosis Association, Minnesota Trudeau Society (originator and president), and Minnesota Public Health Association (president).

Dr. E. A. Meyerding, Executive Secretary of the Minnesota Public Health Association, writes: "The privilege of close association with Dr. Harrington, particularly during the period he was president of the Minnesota Public Health Association deepened my respect for his knowledge and judgment in professional matters. I have always had a sincere admiration for the qualities that gave him leadership in the field of public health. One could ever be certain of the accuracy of information and of a nice discrimination between established facts and theories in all his writings and utterances on public health matters.

"My respect for his fearless stand for his own convictions in matters of policy and administration in his official capacities is matched by my affection for his lovable qualities and my enjoyment of his sense of humor. When Dr. Harrington gave his friendship, the recipient felt honored and proud, and well he might. I am happy indeed to have the feeling of being close to a man of his sterling worth."

Dr. Harrington has served on a large number of committees and was appointed to the Hennepin County Sanatorium Commission for a three year term, beginning in 1937. He insisted that all contagious cases of tuberculosis be admitted to the sanatorium and, therefore, was a firm supporter of the institution.

The retirement age was attained only a few months before he had served as Commissioner of Health for twenty-five years. Never in the history of Minneapolis had a health officer served so long. Over the years various political parties were in office and he served under seven mayors, always in full cooperation with the administrations. General George E. Leach, who officiated twelve years as Mayor of Minneapolis (1921 to 1929, and again from 1937 to 1941), says: "During my terms as Mayor and President of the Welfare Board I grew to know Dr. Harrington over a period of twenty years, and I always admired his unflinching courage and convictions when a situation arose concerning the health of our community. He was absolutely honest and fearless in his work and was always more than willing to give unstintingly of his time to other organizations which served the public health and welfare of the community. To my mind he is one of the most outstanding and capable public health officials of the nation and for many years has been looked upon in that light by others in the public health field of our country."

Dr. Harrington always manifested the courage of his convictions. Whatever he believed to be right took precedence over everything else. He left no one in doubt regarding his position on any subject. He had no fear of politicians, pressure groups and the like. It was his philosophy that hewing straight to the line would never justify criticism. Should any group prefer wrong to right and attempt to force an issue, he would not yield even though his position were seriously threatened. He never resorted to underhand methods but always fought straight from the shoulder, knowing that right ultimately prevails. He adhered strictly to health laws and ordinances which had been enacted for the public good as he was employed by the city as the legally responsible guardian of the public health. Enforcing the law, he said, was not a personal matter but must be done whenever infractions occurred or were repeated.

He never worked by the clock but until the job was done, regardless of how many holidays or Sundays intervened. His devotion to the Division is the main reason so much was accomplished on a ridiculously small budget. (In 1935 the per capita expenditure was 30 cents, and had been increased to only 45 cents in 1941, while several other cities of the same size were spending $1.50 per capita.)

David Ellison, in charge of the venereal disease work for nearly twenty-five years, writes: "My association with Dr. Harrington encompassed almost a quarter of a century, beginning July 1, 1921, when I interviewed him about a position with the Health Department, the newly created post of Venereal Disease Health Officer. It was conspicuous that with Dr. Harrington there was no hedging or favoritism. Neither was he burdened with preformed rigid ideas about higher degrees, or literary or collegiate attainments. He was concerned only with qualifications and background of experience. He said, 'I'm not interested in your politics or your creed, only insofar as they affect your attitude toward the public health. We have been doing nicely without you, but we would like to do even better. You can help us by giving value received, and by remembering that you will owe a debt of service to the people.' The yardstick by which he measured the merit of individual service to the department and to the city was always unselfish and not influenced by personal antagonisms. Dr. Harrington was never known to embarrass or belittle any member of the department. He seemed to expect only conscientious effort and coverage of the position for the benefit of the public and the personnel. Courtesy in contact with the public was a Must and not deviated from under his exemplary leadership. Vacations except to attend public health meetings were not for him, but he encouraged them in those under him. His devotion to his work directed his Sunday and holiday sorties to his office. Himself a devout religionist and prominent lay leader in his own faith, and conservative in politics as he was, he had unusual respect for and tolerance with the views of others. His fluency was as easy with the group as with the individual, so he could always be depended upon in board session or medical society meeting, as well as after-dinner speaker or toastmaster.

"If all the 'Thank Yous' that the citizenry of Minneapolis owe him for a hard job well done could be united into one loud paean, this show of gratitude would strengthen 'The Chief' even if it might surprise and startle him at first."

In 1908 Dr. Harrington married Mary Llewellyn Eliot of Washington, D. C. For nearly forty years Mrs. Harrington has constantly encouraged and supported him in all of his work. They reared five daughters and two sons, who are fine citizens and are engaged in various worthwhile activities. No parents ever provided a finer home from the standpoint of ideals and all that is worthwhile, and no family of children ever manifested more appreciation or took greater pride in the accomplishments and welfare of their parents.

For slightly more than a quarter of a century Dr. Harrington and I have been closely associated. Over most of this period we lunched together from one to several times each week. We took long automobile trips together to other states and Canada. We served conjointly on many committees. We fought in unison when occasions demanded to uphold facts and principles. We solved medical and public health problems together. We collaborated in the writing of medical articles. We conferred with one another on practically every subject, medical or otherwise, that was of vital importance to either of us.

Not until an individual enters the evening of life can a true appraisal be made of his worth. Then in retrospect one sees the qualities he possesses, the contributions he has made, his influence on others and the perpetuating fires he has kindled. In this sketch of Dr. Harrington's life space permitted only brief reference to a few of his accomplishments. He has made a record which many persons should emulate. He has constantly sown seeds of good and an abundant harvest has already been reaped, but from seeds he has sown a much greater harvest will be gathered in the good health of future generations.

Epidemiology of Poliomyelitis

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OPINIONS regarding the epidemiology of poliomyelitis differ so radically that it would be somewhat presumptuous to attempt to present this topic without a word of warning to the reader. The present evidence is not sufficiently clear to permit the formulation of even so much as a theory; at best it warrants nothing better than an hypothesis. Yet hypotheses must be developed as tools to investigation. All hypotheses should be tested against the known facts. Those that are not in agreement with facts must be discarded or modified; those that are in accord with facts may be retained until new evidence requires their rejection or alteration.

There is at present a vast array of facts with respect to poliomyelitis, many more real facts than regarding so well accepted a disease as measles, yet they are not sufficiently clear to permit one to formulate more than a guess. Many hypotheses have been developed but most of them fail at some point to accord with the facts and are therefore of questionable merit. Amid the confusion of ideas, however, certain facts and ideas emerge that seem fairly clear.

Occurrence. Poliomyelitis is not a new disease; on the contrary, it has probably been with us for many centuries, though it was not clearly recognized until the middle of the last century. So long as it was recognized only through its paralytic manifestations, it appeared to be a rare condition and cases bore little relation to each other. Today we recognize, however, that the paralytic and preparalytic cases represent only a very small fraction of the total number of infections. Human infection with the poliomyelitis virus is apparently as widespread as is measles, but usually produces only a transient febrile illness that does not differ clinically from many other minor disturbances, is usually not brought to medical attention, and cannot be diagnosed accurately. Coincidental with every outbreak of poliomyelitis, countless cases of this mild form of poliomyelitis occur; if these are recognized at all, the diagnosis is based more on epidemiological than on clinical grounds. When similar cases occur apart from an epidemic the possibility that they may be abortive poliomyelitis virus infection is not recognized or even considered. Yet careful virus studies of representative samples of the abortive cases show clearly that at least some of these mild disturbances are poliomyelitis. Those cases that progress to demonstrable central nervous system involvement represent only a small segment of the total quantity of infection in the community; only a fraction of these develop to the point of paralysis. Poliomyelitis is thus a widespread, almost universal infection which produces paralysis in only a very small fraction of those attacked. Any hypothesis as to spread must explain dissemination of the virus to the entire community, much as measles or influenza virus reaches all persons during an outbreak.

Poliomyelitis in recognizable form occurs in waves which are more or less unevenly spaced. Severe outbreaks do not occur in successive years in the same community, though minor outbreaks may be so repeated. The epidemic curve is usually of characteristic shape, rising to a peak in about 6 to 8 weeks and declining over an 8 to 10 week period. Changes in the weather produce no effect whatever upon the shape of the curve. Contrary to popular belief, the outbreak is neither stopped nor shortened by frosts, freezes, or any other climatic effect. On the contrary, in those areas where the disease is on the increase at the time of such frosts, it rises to its usual peak, unaffected by such weather changes. In general, however, the summer peaks (of recognizable infection) are higher than are the spring, autumn or winter peaks. The disease occurs at all seasons of the year and in all latitudes, and the duration (though not the magnitude) of the winter outbreaks is apparently the same as at other seasons of the year.

Poliomyelitis most commonly spreads in concentric waves from the point where the outbreak first appeared. This radial spread, clearly recognized and described by Frost in the 1916 New York outbreak, is one of the most constant characteristics of the disease when observed over an area of any size but may not be clear if attention is focused on too small a locality. Thus where poliomyelitis begins early it reaches its peak and ends early, whereas it peaks and persists later in those areas where it begins later. The spread of the infection may thus be likened to the ripples that spread from a stone dropped in a quiet pond, reaching the periphery late and often after the initial splash has actually subsided. In this regard, as in so many other aspects, the occurrence of poliomyelitis closely resembles that of measles, with the notable difference that the full magnitude of the measles outbreak is observable while only a small fraction of the poliomyelitis cases can be recognized. The age distribution is likewise comparable, most of the cases developing in children under 10 years, though a rural population shows an older age selection than does an urban. There is no constant relationship to housing, poverty, or other socio-economic factors. The distribution between urban and rural areas is fairly even.

Considerable interest and speculation have been caused by the apparent seasonal distribution. Although poliomyelitis occurs at all seasons of year, the peak of the recognizable paralytic cases most commonly occurs in the late summer or early fall. In the south the disease usually appears earlier in the year than in the north with consequent earlier peaks. In the northern tier of states, however, the peak is most often in August or September, though July and October peaks occur not uncommonly. This seasonal pattern has been interpreted by some as suggesting an intestinal or insect spread and contraindicating respiratory spread. It is doubtful, however, if it furnishes any clue whatsoever to the mode of spread for it may represent the seasonal pattern of paralytic manifestations and not necessarily the pattern of all poliomyelitis virus infection. Furthermore, there is no greater difference between the seasonal pattern of poliomyelitis and of certain respiratory infections than exists between various diseases which we unhesitatingly ascribe to respiratory spread. Diphtheria usually reaches its peak in November, the minimum month for pertussis. The peak of chickenpox is most commonly attained in December or January, scarlet fever in March, and measles in April or May. There is thus no standard seasonal pattern for respiratory infections. As a matter of fact the seasonal pattern of poliomyelitis and diphtheria are more comparable than are those of measles and chickenpox. It seems unwise, therefore, to ascribe too much importance to the seasonal pattern, and especially hazardous to draw deductions as to mode of spread, especially since we are not certain that the same seasonal pattern holds for the subclinical unrecognized infections.

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Etiology. The role of a virus is clearly recognized and generally accepted. Many strains of virus exist, differing in their pathogenicity but all apparently closely related. The virus is fairly easily destroyed but will survive for some time in sewage.

Reservoir of Infection. So far as is known, man is the only species that is normally infected with poliomyelitis. Although virus somewhat resembling the poliomyelitis virus may be recovered from certain other animals, there is no evidence to suggest that there is a relationship or that any species other than man may serve as a natural reservoir. The largest portion of the reservoir is made up of the unrecognizable subclinical infections. Estimates as to their frequency as compared to the paralytic cases range from 10 to 1000 such cases for every paralyzed case. Probably this figure varies in different outbreaks; there is good evidence to suggest that it may vary with the season, being higher in winter outbreaks than in those which occur in the summer. Children are more commonly infected than are adults. Although it is commonly stated that "healthy" carriers exist, the differentiation between a carrier and a missed case is far from clear. There is no clear-cut evidence to suggest either that a person may remain a carrier for years as in typhoid, or that a person who was once infected with the virus but was freed of the infection may later re-acquire the infection as a "healthy" carrier, as occurs with diphtheria bacilli, pneumococci, or meningococci. On the contrary, there is good reason for thinking that the true carrier, if he exists at all, is rare and of very minor importance as compared with the unrecognized subclinical infection or the convalescent carrier. Virus has been recovered from the feces as long as two weeks before the development of poliomyelitis. This observation, which has been confirmed on several occasions, shows that a patient may be capable of transmitting infection for several days before the onset of the prodromata.

Escape from reservoir. Poliomyelitis virus is found in the upper respiratory tract and the feces of recognizable and subclinical infections, and possibly in healthy carriers. Escape from the reservoir can thus be achieved either via respiratory secretions or via the feces. The virus is found more readily, in greater abundance, and over a larger period of time in the feces than in the throat. The significance of this observation is not clear, but it is commonly interpreted as indicating that the virus multiplies along the intestinal tract. The extent to which the virus in the stool is attributable to the swallowing of virus from the nasopharynx is not clear. It is certain, however, that the mere presence of virus in the feces does not prove that the spread of the disease is through the intestinal rather than the respiratory tract. Numerous organisms may occur in the feces yet their escape through this channel may be of no epidemiologic significance.

Transmission of infection. So long as the only cases which were recognized were those that were paralyzed, cases which were in some way associated with each other were very rare. Today with the recognition of preparalytic infection and of sub-clinical or abortive infection, it is common to find association between cases. Multiple cases within a family are of common occurrence, rather than a rarity as was formerly believed. It has become increasingly apparent that contact is a factor of major importance in the spread of the disease, though very divergent ideas exist as to the nature of the contact whereby the infection is acquired. In general three hypotheses exist.

1. The hypothesis most commonly accepted by epidemiologists is that of respiratory tract transmission. In support of this hypothesis is the general pattern of occurrence: spread in radial fashion from various foci without regard to distribution of water, milk, or food supplies; wide spread over large areas; and constancy of epidemic curve unaffected by changes in climatic factors. In brief, the pattern of spread and the relative age distribution between urban and rural areas is that which characterizes respiratory-spread infections and is not found in diseases known to be spread through the intestinal tract or through arthropod vectors. Evidence based on analogy is obviously less convincing than that based on confirmed observations, yet it is through analogy (and nothing else) that we deduce that measles, whooping cough and various other diseases are respiratory-spread. In brief, their occurrence is consistent with the hypothesis of respiratory tract spread and not of spread through other simple mechanisms. The evidence to suggest spread of poliomyelitis through the respiratory tract is of the same order of probability (or improbability) as is the evidence of the spread of measles through the same mechanism.

2. A second hypothesis, apparently more attractive to clinicians and bacteriologists than to epidemiologists, is that of intestinal spread. The proponents of this hypothesis rest their case chiefly on the demonstrated occurrence of virus in stools for a longer period of time and in greater quantity than in the respiratory tract. It has been suggested that the virus, which can be demonstrated in sewage, finds access to water, milk or food and through such a vehicle to a new victim. Others have

suggested a direct, almost wholesale fecal contamination of the hands, spreading from person to person through contact, food, or inanimate objects. Yet the spread of the infection within a community or from one community to another, over an entire segment of a country, bears no resemblance to that of any other disease of apparent intestinal spread. On the contrary, outbreaks occurring in the metropolitan areas served by multiple water, milk and food supplies spread in radial fashion without regard to water, milk or food distribution patterns. Spread of infection within a single year over the entire mid-west, the north-eastern quarter of the United States, or other area of comparable magnitude is hard to explain on such an hypothesis, yet comparable spread of respiratory diseases such as influenza or measles is one of the most constant features of these infections. No outbreak of any magnitude has been described that is consistent with the hypothesis of spread through the medium of water or food; only three or four outbreaks are recorded in which the evidence for spread through milk is even tenable.

3. A third hypothesis of great popular appeal but resting on very weak foundation is that of spread through the medium of arthropods, most probably flies or mosquitoes. The only item of real evidence in support of this hypothesis is the fact that on two or three occasions the virus of poliomyelitis has been isolated from flies that had access to sewage from which the virus could equally be recovered. The concentration of recognizable poliomyelitis in the summer has been considered by some as suggesting insect spread. Yet the occurrence of poliomyelitis at all seasons of the year, the rise and fall of an epidemic within a locality without regard to climatic conditions which affect insect population, and the complete lack of cessation of outbreaks coincidental with the advent of frost or freezing weather are hard to reconcile with this hypothesis. Furthermore, there is no evidence to even suggest that the highly popular and frequently much publicized spraying with DDT or other insecticides has any effect whatsoever in shortening an epidemic. Yet comparable spraying has been found to be definitely effective in controlling other diseases spread by mosquitoes and flies.

It is apparent from the foregoing that the hypothesis of respiratory spread is the only one that is consistent with the known facts regarding the occurrence of poliomyelitis, and that neither the intestinal nor arthropod-spread hypothesis is adequate. Obviously this does not prove the accuracy of the first hypothesis, yet it does weigh heavily against the others. It is, of course, possible that all three hypotheses may be correct in that occasional infections may be acquired by intestinal or arthropod spread yet the major portion of the cases be infected via respiratory spread. The latter seems at the moment to be the only mode of spread that can explain the bulk of the infections.

Entry of virus. Controversy still exists regarding the site and mode of entry. Aside from intracranial injection, instillation into the nostrils is the most effective mode of infection of the experimental animal whereas ingestion and subcutaneous injections are poor modes of entry. The high incidence of bulbar cases among children tonsillectomized during an epidemic suggests entry via the nerves or lymphatics of the upper respiratory tract. Entry via exposed dental pulp has even been suggested though on grounds that are still highly inconclusive.

Resistance. The extent and nature of resistance to poliomyelitis is as controversial as is the question of spread. The age distribution of the disease indicates that resistance is acquired or increases with age and that it develops earlier in life in urban than in rural areas. Group testing based on recognition of antiviral properties in the blood appears to yield fairly reliable evidence regarding the resistance of the group, but little reliance can be placed on the results of tests of individuals. Reasonable grounds still exist for debate as to whether the antiviral properties represent a true response to infection or are evidence of a physiological maturation phenomenon. Much of the uncertainty may be due to the fact that several strains of virus exist, and the cross immunity to these several strains is very poorly understood. The extent to which poliomyelitis infection produces resistance to subsequent infection is also poorly understood. That the resistance is not invariably solid is demonstrated by the fact that second paralytic attacks have been observed on several occasions.

Autarceologic resistance. If present concepts are correct that poliomyelitis infection is as widespread as is measles, it is important to inquire as to the reasons why so small a fraction of those infected acquire paralytic manifestations, and, if possible, to determine the factors that condition the development of a paralytic infection in one person and a non-paralytic in another. For many years it has been suggested that those factors were to be found in the physiological makeup of the individual rather than in the antiviral immunity mechanism. These physiological factors which may condition the individual's response to infection have been referred to by Aycock as the autarceologic factors and the phenomenon of physiologic resistance as autarcesis. Although the terms have not been widely accepted, they convey a definite idea that is not limited in its scope to poliomyelitis.

The nature of the autarceologic factors is certainly not well understood. During the 1916 outbreak, Draper suggested that the child with paralytic poliomyelitis tended toward a certain physiological type that often bordered on an endocrine imbalance. The high incidence of poliomyelitis in pregnancy, the increased susceptibility of the castrated monkey to experimental infection, and the reported increased excretion of estrogenic substances in the urine of paralytic patients further suggest endocrine imbalance as a factor governing the response to virus invasion. An hereditary susceptibility to paralytic manifestations is suggested by the studies of Aycock who has shown the high incidence of such form of the disease within family groups.

The importance of the autarceologic phenomenon cannot be currently evaluated but there is excellent reason for suspecting that it may hold the key to a better understanding of the disease. The most ardent supporters of this hypothesis even see in it a possible explanation of the anomalous seasonal pattern, pointing out that the apparent seasonal pattern may be only that of paralytic forms, not of all poliomyelitis virus infection. There is good reason for suspecting that during the summer months there is a higher proportion of paralytic manifestations than at other times of the year and that this may possibly be due to a seasonally altered physiologic response to the virus. According to this concept, poliomyelitis may spread at all seasons of year, possibly fairly equally, but during the summer produce a higher incidence of paralyses due to a higher individual susceptibility to the paralytic form of the disease. Infection during the winter may be widespread but hidden owing to the lack of paralyses. Certain it is that the disease occurs at all seasons, that winter outbreaks are of equal duration but less apparent magnitude than summer outbreaks, and appear to have a comparable immunizing effect upon the community as evidenced by resistance to reinfection the subesquent year.

The foregoing brief summary of certain facts and hypotheses with respect to the epidemiology of poliomyelitis should make apparent the inadequacy and uncertainty of current concepts. Although there is a great mass of factual information with respect to the occurrence of poliomyelitis involving the central nervous system, information with respect to the inapparent abortive infections is very inadequate, yet these probably constitute the majority of the infections. There is no certainty that they present comparable epidemiologic manifestations. Were there no rash in measles, and our epidemiologic thinking limited to those cases showing encephalitis or a complicating pneumonia or otitis, our concept of the disease might be quite different from that which prevails today. Until some means of recognizing and tracing the spread of the subclinical poliomyelitis infections is discovered, we shall probably remain in the realm of hypothesis, forced to select that which is most consistent (or possibly least inconsistent) with the observable facts. The author cannot escape the feeling that for the moment the most tenable is that of respiratory spread, with unrecognized and possibly seasonally variable autarceologic factors governing the development of paralytic manifestations.

PUBLIC HEALTH IN ENGLAND DURING SIX YEARS OF WAR

A report of the chief medical officer of the Ministry of Health has just been published, "On the State of the Public Health During Six Years of War." It tells of the public health and of the medical work during the trials of the grimmest struggle that Britain has endured. Vital statistics were phenomenally good. The birth rate, rising from 1941 onward, reached 17.7 per thousand of population in 1944, the highest since 1926 and within 1 per cent of the replacement standard, though it has fallen since. A feature was the low mortality of children from disease. Despite the loss of 7,000 lives at ages under 15 as a direct result of enemy action, and an increase of accidental deaths arising through war conditions, the mean annual deaths during 1940-1944 were below the rates for any year prior to 1939 at every age from 1 to 5 and at 5 to 9 and 10 to 14. The year 1939 was remarkable in low figures for mortality at every age group under 15 years. It was not expected that better figures would be obtained during the war, but new records for the second and third years of life were set up in 1942 and for the first, second, fourth and fifth years and at 5 to 9 years for 1942. The stillbirth rate declined continuously throughout the war, while successively low records for maternal mortality were established in 1940, 1942, 1943 and 1944. Considerable reductions in infant mortality rates occurred in the cities between 1938 and 1944. Thus there was a fall in London from 50 to 43 and in Manchester from 69 to 54. There was an increase in population at the ages most liable to fatal diseases, yet the period 1942-1944 showed reductions compared to the prewar years in a long list of causes of death, such as tuberculosis and pneumonia. During the war we escaped serious epidemics excepting for the occurrence of cerebrospinal meningitis, but its mortality was greatly reduced by new methods of treatment, which are estimated to have saved as many as 15,000 lives during the past five years. Two short epidemics of influenza, which were of a mild type, occurred.

The increase of early syphilis (counting civilians seen at the treatment centers and infections of British service men stated to have been contracted in this country) amounted to 140 per cent over the figures for 1939. There are greater difficulties in estimating the incidence of gonorrhea, but it is estimated that the increase was not so great, that it reached its peak in 1942, when it was probably 86 per cent higher than in 1939, and that in 1944 the percentage increase declined to 35. The problem of venereal diseases has been met by intensive propaganda on the importance of prompt treatment, the tracing of contacts and compulsory treatment of the recalcitrant spreaders of infection. Sulfonamides and penicillin have been most useful in reducing the period of infectivity.

Despite fatigue, monotony of diet and the restrictions of rationing, the nutritional state of the nation was maintained and, as regards children, seemed to be even better than before the war. This nutrition was the basis of the improved health of the population. The national loaf was improved by higher extraction of flour, and margarine was enriched by addition of vitamins A and D.—*J.A.M.A.*, October 5, 1946.

Immunization Against Pertussis

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Evanston, Illinois

SMALLPOX and diphtheria have been eliminated in this country to a very marked degree following immunization with smallpox vaccine and diphtheria toxoid. However, more young children still succumb from pertussis and its complications, than from all other communicable diseases of childhood combined. The importance of the problem of pertussis control is vividly illustrated in Table 1, which compares the deaths from pertussis and diphtheria in this country during recent years. During the past ten years ample evidence has accumulated in the scientific literature on prevention of pertussis following administration of pertussis vaccine, to warrant employment of this important preventive medical procedure by physicians and health departments on a scale comparable to that of smallpox and diphtheria prevention programs.

TABLE 1
COMPARISON OF DIPHTHERIA AND PERTUSSIS IN THE UNITED STATES
REPORTED CASES AND DEATHS, 1940-1944*

	1940		1941		1942		1943		1944	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Diphtheria	15,536	1,457	17,987	1,293	16,260	1,273	14,811	1,196	14,150	1,145
Pertussis	183,866	2,926	222,202	3,785	191,383	2,536	191,890	3,368	109,873	1,878

*Cases from the United States Public Health Service; deaths from the Bureau of the Census.

Although H. pertussis vaccine was first used in the attempted treatment of pertussis by Nicolle and Conor[1] in 1913, it was not until 1925 that Madsen[2] demonstrated that the severity of this disease could be markedly reduced by the prophylactic use of vaccine. Sauer[3] was the first investigator to prove that the disease could be prevented in children by the injection of potent vaccine. The total dosage used by him was about four times that employed by Madsen, and it was administered months prior to anticipated exposure. His work has been confirmed by other investigators, among whom Kendrick and Eldering[4] and Daughtry-Denmark[5] reported on extensive studies. An excellent and complete monograph on all phases of the pertussis problem was published by Lapin[6] in 1943.

Since 1926, the Evanston City Health Department in this community with a population of 70,000 has sponsored an immunization clinic in which infants and preschool children in the indigent and low income brackets, referred by the Infant Welfare Society, have been routinely immunized against smallpox and diphtheria. In 1934, a program of pertussis immunization was added, and children between the ages of seven months and two years from the same group have received injections of pertussis vaccine without cost to them. In addition, private physicians have also adopted the use of pertussis vaccine as a routine measure, with the result that the incidence of the disease has been markedly reduced in this community during the past ten years. (Table 2).

When pertussis immunization was initiated in the Evanston Health Department Clinic, a vaccine prepared from freshly isolated strains of phase I H. pertussis bacilli grown on Bordet-Gengou medium containing human blood was employed. The bacterial growth was scraped off the medium into sterile normal saline, without intermediate washing of the bacterial cells, and phenol in a concentration of 0.5 per cent was added as a preservative. This vaccine contained ten billion (10,000 million) pertussis bacilli per cubic centimeter. Evidence of satisfactory immunity was determined through careful checking of all cases of pertussis which occurred subsequently, to determine whether or not the child had previously received pertussis vaccine. The incidence of pertussis in the vaccinated group was then compared to that in an unvaccinated control group of the same age and social status. Additional studies were made on simi-

TABLE 2
PERTUSSIS IN EVANSTON, 1921-1946

Year	Cases	Deaths
1921	120	2
1922	487	1
1923	264	2
1924	222	2
1925	443	2
1926	163	3
1927	248	0
1928	443	1
1929	403	0
1930	481	0
1931	256	3
1932	336	0
1933	215	0
1934	181	0
1935	602	0
1936	91	0
1937	132	0
1938	132	0
1939	223	0
1940	42	0
1941	115	0
1942	83	0
1943	159	0
1944	3	0
1945	33	0
1946	44	0

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*Commissioner of Health.

lar vaccine in concentrations of 15 and 20 billion pertussis bacilli per cubic centimeter, and it was found that the optimum concentration for best results and fewest reactions was a vaccine containing 15 billion bacilli per cubic centimeter.

In 1938, a study was begun on the effects of simultaneous immunization of children against both pertussis and diphtheria by mixing pertussis vaccine and diphtheria toxoid. As evidence of satisfactory immunity, a pertussis complement fixation test was performed on blood specimens taken from the vaccinated children 6 to 12 weeks after the last injection. In addition, determinations of diphtheria antitoxin blood concentrations and Schick tests were performed as an index of immunity against diphtheria. Children who failed to develop adequate immunity against pertussis and diphtheria according to our standards, were given a stimulating or "booster" injection of 2 cc. of the mixed antigens. The results of this study were reported by Sauer and Tucker[7] in 1942, and a report of a similar study was also published by Kendrick[8] at the same time. Both studies revealed that it was possible to immunize children successfully against both pertussis and diphtheria by mixing pertussis vaccine and diphtheria toxoid, and administering the two antigens simultaneously in the same syringe. We employed doses of 2 cc., 2 cc., and 3 cc. of the mixed antigens subcutaneously in alternate arms at three week intervals. Although reactions were infrequent, this dosage was too large.

Table 3

Pertussis and Diphtheria Deaths in the United States During the First Year of Life by Month of Death*

	Under 1 mo.	1	2	3	4	5	6	7	8	9	10	11	Under 1 Yr.
1943													
Pertussis	104	397	370	288	209	191	179	173	151	144	109	104	2,419
Diphtheria	7	4	8	12	4	5	2	7	7	8	10	16	90
1944													
Pertussis	59	197	195	169	125	94	90	87	92	80	61	74	1,323
Diphtheria	4	6	5	5	4	7	7	5	13	7	9	17	89

*From the Bureau of the Census.

Simon and Craster[9] had employed an alum precipitated mixture of the two antigens, but the results after injecting only two doses of 1 cc. each revealed inadequate protection. Accordingly, we began studying an alum precipitated mixture of the two antigens. We administered an alum precipitated preparation containing 15 billion pertussis bacilli and the standard immunizing dose of diphtheria toxoid in each cubic centimeter approved by the National Institute of Health. A dose of 1 cc. of this mixture was injected into alternate arms (deep subcutaneous injections into the triceps and deltoid regions are most satisfactory) at three week intervals. The usual complement fixation and Schick tests were performed as an index of satisfactory protection. Sauer, Tucker and Markley[10] reported the results of this study, and called attention to the occurrence of "sterile alum abscesses" (apparently due to irritation of the aluminum sulphate) in two per cent of the children injected. This complication has been discussed by Leake[11] of the United States Public Health Service, who stated that the fluctuant area which sometimes appeared at the site of injection was not a purulent abscess, but a sterile cyst which should not be incised, and when undisturbed will gradually disappear.

For the past thirteen years, we have complete morbidity histories of 5590 children in this community who received pertussis vaccine after the age of seven months. Of this group, only 71, or 1.3 per cent have developed pertussis. It is quite possible that others may have developed mild pertussis which was not recognized as such. Accordingly, the results of our pertussis immunization program are very satisfactory, and definitely indicate that pertussis can be controlled by vaccination.

For many years, physicians have been aware of the high death rate from pertussis in young infants (Table 3). Accordingly, when we began our studies on active immunization against pertussis in young children, infants as young as one to three months of age received the customary dose of plain pertussis vaccine. We found that the incidence of pertussis in infants under six months of age who had received the vaccine was so high it could not be recommended for use so early in life. However, Sako[12] et al. administered alum precipitated pertussis vaccine to infants as young as one month of age with subsequent injections at one month intervals, and showed that the morbidity and mortality rates were markedly reduced.

Since late in 1945, an alum precipitated mixture of pertussis vaccine and diphtheria toxoid has been administered in our clinic to infants four months of age, with second and third injections at five and six months of age respectively. Schick and pertussis agglutinogen skin tests as well as diphtheria antitoxin blood levels and pertussis complement fixation reactions were performed routinely three months after the last injection. Adequate immunity against diphtheria was conferred in all of the infants injected, and adequate immunity against pertussis occurred in two-thirds of the infants injected so early in life.

Investigators[13] at the University of Pennsylvania have been studying a skin test to determine pertussis susceptibility, and as an index of adequate artificial immunity following administration of pertussis vaccine. The preparation employed in the skin test is purified pertussis agglutinogen, which is obtained from pure cultures of H. pertussis. An intracutaneous injection of 0.1 cc. of the test material is made on the forearm, and the test is read twenty-four hours later. An area of edema 10 mm. or more in diameter is evidence of adequate immunity against pertussis. This work has been corroborated by Sauer and Markley,[14] who found a correlation of 72 per cent when comparing the agglutinogen test with their standard pertussis complement fixation test. Accordingly, a tool is now available for determining pertussis susceptibility, and this skin test warrants wide use in pertussis immunization programs. In our opinion, it is as specific for pertussis, as the Schick test for diphtheria and the Mantoux test for tuberculosis.

The American Public Health Association [15] recommends immunization against pertussis as follows. "Artificial active immunization is recommended for children in the early months of life, not before the third month, and preferably before the sixth month." Accordingly, we recommend that immunization of infants be started at four months of age, by employing alum precipitated pertussis vaccine only, or a mixture of alum precipitated pertussis vaccine and diphtheria toxoid. A mixture containing tetanus toxoid in addition to pertussis and diphtheria antigens is not recommended for children as young as four months of age. The American Public Health Association [15] recommends that active immunization against tetanus be carried out "in those areas where there is a special risk of tetanus." In consideration of the low morbidity and mortality rates from tetanus as compared to pertussis and diphtheria, the writer feels that active immunization against tetanus should be postponed, or eliminated entirely in favor of protection of infants againts pertussis and diphtheria.

In this paper, immunization against pertussis means the development of active immunity in human beings, following administration of a pertussis vaccine preparation containing freshly isolated strains of phase I bacilli approved by the Council on Pharmacy and Chemistry of the American Medical Association.[16] It does not mean prophylactic treatment of contacts with vaccine or serum after exposure to a case of pertussis. There are several antigenic preparations containing pertussis vaccine now available on the market. Some of these contain pertussis bacilli only, either plain in saline suspension, or alum precipitated. Others are available as mixtures with diphtheria toxoid, or with diphtheria and tetanus toxoids, plain or alum precipitated. The manufacturers recommend time intervals between injections ranging from one week to one month. After long experience, we are convinced that the optimum time interval between injections of any preparation containing pertussis vaccine should not be less than three weeks to one month.

SUMMARY

In our hands, administration of pertussis vaccine to young children has resulted in reduction of this most serious communicable disease of early childhood to such an extent that pertussis is no longer a problem in this community. Because of the high pertussis death rate in infants, it is recommended that protection against pertussis be carried out with an alum precipitated preparation before or simultaneously with immunization against diphtheria between the age of four and six months. Vaccination against smallpox can follow these, preferably at one year of age. Active immunization against tetanus may be employed in communities where tetanus occurs, particularly in agricultural areas.

The most desirable time interval between injections is one month. Physicians will find it most convenient to administer pertussis vaccine during the routine monthly office visits of infants in the early months of life. All injections of pertussis vaccine, or antigenic mixtures containing pertussis vaccine should be made into the deep subcutaneous tissue over large muscle masses in the arms or buttocks. To reduce the possibility of cyst formation to a minimum, 0.1 cc. of air may be injected simultaneously with the antigen, and light massage over the site of injection is recommended. Care should be exercised to be certain that injections are not repeated in sites previously used.

Pertussis vaccine preparations should contain freshly isolated strains of phase I H. pertussis bacilli, and great care should be taken to keep such products refrigerated at all times when not in use. Alum precipitated antigen preparations should be administered in deep subcutaneous tissue for best results. The occasional occurrence of local or systemic reactions do not contraindicate the use of these products.

A stimulating "booster" dose of pertussis vaccine should be administered to previously immunized children just prior to entering school, and also when exposed to pertussis. Employment of a mixture of pertussis vaccine and diphtheria toxoid for this purpose is a valuable procedure, and has the advantage of increasing diphtheria immunity at the same time. The pertussis agglutinogen skin test for determining susceptibility to pertussis is a reliable test, which should be employed in all future pertussis immunization programs.

CONCLUSIONS

Pertussis can be prevented in a very high percentage of young children by administering potent pertussis vaccine early in life, preferably between the ages of four and six months.

The high death rate from pertussis in young children places the responsibility for pertussis immunization upon private physicians and health departments, to the same extent that active immunization against diphtheria and smallpox is employed.

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YOUR PATIENT PLANNING A TRIP ABROAD?

The Health Advisory Council of the U. S. Chamber of Commerce has called the attention of chambers of commerce throughout the United States to a list of health rules for persons traveling abroad, issued recently by the San Francisco Department of Public Health.

Before starting be vaccinated for typhoid, paratyphoid, smallpox, yellow fever, typhus and cholera. The first three are musts—the last three discretionary, dependent upon destination and regulations of the countries to be visited.

Have a thorough dental examination to minimize the possibility of toothache or other dental disturbances.

Secure a small first-aid kit containing sterile dressings, antiseptic, talcum powder, powdered medicinal charcoal for diarrheal conditions, burn ointment, aspirin, throat lozenges, zinc oxide ointment, Halazone tablets (4 mg.), splinter forceps; a small supply of sulfaguanadine and atabrine (if obtained by written prescription of your physician); also obtain a pyrethrum aersol bomb for mosquitoes and flies.

Eat and drink only articles known to be clean and free from contamination.

Water must be boiled for at least five minutes or otherwise sterilized. For chemical sterilization of water add 2 Halazone tablets (4 mg.) to one quart of water and let stand one-half hour before using. If any doubt exists, drink only tea or coffee, without cream or milk, made from boiling water and served hot and steaming.

Avoid ice, ice cream, cheese and butter. Never drink unboiled milk. Drinks may be cooled in original containers.

Never eat raw food or salad, except fruit which you have dipped in boiling water and then peeled.

In hot climates, be very moderate in the use of alcoholic drinks.

Eat salty food when perspiration is excessive; or use salt tablets (5 gr.) dissolved in water or common salt, 2 tsp. daily.

For brushing teeth, be sure to use boiled water; tap water in many hotels is from polluted sources. Keep hands away from mouth. Always wash the hands with soap and water before eating.

Avoid over-exposure to sun by wearing a well-ventilated hat or helmet, sun glasses and protective clothing. To minimize sunburn apply zinc oxide ointment.

For protection against biting insects and flies, use aerosol bombs on surroundings. Proper use of mosquito nets when in malarious districts as well as insect repellents are valuable.

In case of illness seek competent medical attention through the United States Consul or the local health officer.

STATISTICS ON POLIO

With total polio cases this year at 19,641 to October 5, or more than the entire year 1944, 1946 was expected by U. S. Public Health authorities to reach a grand total of as high as 23,000. This compares with 27,363 during the epidemic year 1916.—*Victor News*, November, 1946.

The Control of Influenza by Immunization*

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UNTIL RECENTLY, immunization against influenza was a subject discussed primarily by those engaged in the investigation of virus diseases. No longer, however, is the question of influenza immunization one to be debated exclusively in academic or scientific circles. The results of sound experimentation have provided the basis for the advancement of the problem beyond the research laboratory and into the realm of applied preventive medicine.

Although it is true that the evidence for the efficacy of vaccination has been acquired only within the past three years, the uncertainty that appears to prevail among many physicians as to the value of influenza immunization or the need for such a procedure can be attributed, only in part, to a limited acquaintance with the results of the controlled studies. There are other reasons. It is my impression that a most important one is the lack of a clear understanding of the clinical aspects of the disease that influenza vaccine is supposed to prevent.

It is not surprising that influenza, as a clinical and epidemiological concept, should be associated with the extreme manifestations of the disease as it was seen during the most striking episode in history; namely, the highly devastating plague of 1918 in which large numbers of people died of a rapidly fulminating disease. Continued study has revealed, however, that the 1918 experience represents only part of the story of influenza; by no means is it the whole story. Since the discovery of the viruses of influenza A[1] and influenza B,[2,3] within the past 13 years, it has been amply demonstrated that, epidemiologically, the disease varies in extent and intensity.[4]

In infectious disease, generally, it is well known that individual cases vary widely in clinical severity. For example, one does not hesitate to consider mild cases of measles and severe cases, with complicating pneumonia, as caused primarily by the same etiologic agent. With influenza, however, because of the lack of striking diagnostic criteria—comparable to the rash of measles—the less severe cases of influenza are, more often than not, included together with the large number of common respiratory diseases of undetermined etiology, often designated by such diagnostic terms as "bad cold", "bronchitis", "grippe", etc.

Unless appreciation is had of the variations in the clinical characteristics of infections caused by the influenza viruses, and the extent to which they contribute to the cause of respiratory disease and to premature death, it is difficult to accept the need for an immunizing agent. For this very important reason, I should like to illustrate briefly the role played by the influenza viruses as a cause of disturbance in the mass as well as in the individual.

THE MASS EFFECT OF INFLUENZA VIRUS ACTIVITY

The difficulties in obtaining accurate statistics with respect to the incidence of all forms of respiratory disease can readily be appreciated. Nevertheless, for the present purpose reference may be made to information gathered by the United States Public Health Service. The data to which I refer[5,6] were obtained through house to house canvassing shortly after several of the influenza epidemics that have recurred since 1918. From the total number of cases of respiratory disease that required the patient to be in bed for at least a day, it was estimated in fairly large and representative sections of the population that between 10 per cent and 20 per cent of persons in all age groups had illnesses that were considered influenza, grippe, pneumonia, or cold. Since the cases tabulated occurred during a period of three to four months of influenza prevalence and since sickness obviously due to other known causes had been excluded, it can be assumed that a large proportion of illness revealed by the surveys was due to influenza virus. In other words, in a city of 100,000 persons, close to 10,000 to 20,000 had become ill within a period of several weeks as a result of infections caused by an influenza virus. This assumption is supported by independent laboratory studies during recent epidemics in which the presence and the extent of the prevalence of the virus in the population were ascertained by direct isolation of virus or by serological tests. Reference to the records of practicing physicians will reveal some of the busiest days to have occurred during these periods. Newspaper accounts report the closing of schools and interference with the normal progress in industry.

In addition to causing an illness from which recovery in a matter of a few days is the rule, infections by the influenza viruses predispose to complications that are often much more disturbing than the original infection. Furthermore, in a small, but definite number of cases fatalities occur. Considering the statistics for mortality, the records of the United States Public Health Service have revealed that in 90 large cities during the influenza A epidemic of 1943-44, for example, the mortality from all causes in excess of the normal expectancy amounted to 50 per 100,000 population. Although this is considerably less than the estimated 598 per 100,000 in the 1918-19 epidemic, it still suggests that the influenza virus was a primary or a contributory factor in the death of 50 out of every 100,000 persons in the areas in question.

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*Studies referred to were largely supported by the Commission on Influenza, Board for the Control of Influenza and Other Epidemic Diseases in the Army, Preventive Medicine Service, Office of the Surgeon General, U. S. Army.

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These illustrations may be an oversimplification; nevertheless, they do indicate the effect of the periodic activity of the influenza viruses upon large numbers of people. In the twenty-eight years that have elapsed since 1918 there have been seventeen epidemics in the United States, spaced at intervals that have varied from one to three years. Since the virus of influenza A was not discovered until 1933 and the virus of influenza B until 1940, the etiology of only the more recent epidemics has been established with certainty. One can merely speculate that the viruses known today were related to the 1918 episode. The variation in severity of epidemics of known etiology suggests that the difference between the 1918 epidemic and those that have followed may have been due, in part at least, to variations in the virus. Although the viruses have been found as the cause of sporadic cases and of localized outbreaks at all seasons, epidemics of influenza A seem to have recurred at intervals of two to three years and during the winter months; and the cycle for influenza B appears to be four to six years.[7] The distinction between the two viruses is based upon antigenic characteristics. This means that the Type A virus produces antibodies only to itself and not to Type B, and vice versa. Moreover, immunity to the A type does not confer immunity to the B type, and vice-versa.

TABLE: DEGREE AND DURATION OF FEBRILE PERIOD IN 10 CASES OF INFLUENZA "A"
(Epidemic of 1943-44)
MAXIMUM DAILY TEMPERATURES

Day of Illness	B. C.	G. C.	H. S.	F. C.	F. H.	F. B.	R. P.	F. D.	R. T.	W. Y.
1	104.0	102.4	101.6	103.6	101.2	101.0	101.0	101.2	100.4	99.6
2	105.0	104.0	102.4	102.0	102.6	100.0	N	N	N	N
3	104.0	102.6	102.2	N	N	N				
4	100.2	101.0	102.2							
5	102.0	101.8	101.2							
6	101.0	N	N							
7	100.6									
8	N									

VARIATIONS IN THE CLINICAL SEVERITY OF INFLUENZA VIRUS INFECTIONS

From experience thus far, the clinical characteristics of influenza A and influenza B are indistinguishable. One of the important features of infections in man caused by these viruses is the extreme individual variation in the degree of illness produced. This fact which has been revealed by correlated clinical and laboratory studies is not generally appreciated. Illnesses proved to have been caused by the influenza viruses during epidemic prevalences have ranged in severity from the typical prostrating attack, in which fever and symptoms last as long as a week, to mild indispositions of a day or more, in which a diagnosis of nothing more than "slight cold" may be made. From the viewpoint of the present discussion suffice it to point out that, during epidemic periods at least, the influenza viruses cause a considerable number of cases of respiratory infections not ordinarily attributable to them. For example, during the epidemic of 1943-44 in a particular population,[8] the virus of influenza A caused illness of sufficient degree to warrant a clinical diagnosis of influenza and confinement to bed in approximately 8 per cent of the group, while an additional 17 per cent had infections of the respiratory tract which are not ordinarily considered influenza, clinically, and which did not interrupt normal activity; in another 15 per cent the infection was asymptomatic and was revealed only by serological study. The degree of variation observed in febrile cases is further revealed by the temperature records of ten patients who were ill during the Type A epidemic of 1943-44 (see Table). Records of patients with Type B influenza show similar variations.

Although it has been the preponderance of cases of the type just referred to that has given the impression of "mild" influenza epidemics in recent years, to distinguish them from what is sometimes called "real" influenza or "pandemic" influenza of the 1918 variety, the distinction is not quite that absolute. There have been several reports of cases which have come to necropsy and from which the viruses of influenza A or influenza B have been isolated. In the majority of such instances, a complicating bacterial pneumonia was present. However, in two of the five fatal cases recently reported by Parker, Jolliffe, Barnes and Finland,[9] no significant pathogenic bacteria could be demonstrated.

It should be clear from this brief summary of the characteristics of influenza virus activity in population groups and in the individual that the disease constitutes a real problem. If prediction based on past experience is of interest, the problem of influenza warrants immediate attention, since an epidemic of influenza A can be anticipated during this coming winter (1946-47). It would seem from the foregoing that if susceptibility to influenza virus infections could be reduced by immunization, then a very considerable amount of disease would be prevented, or diminished in severity, and a certain number of deaths avoided. The way in which this may be accomplished is the subject of the remainder of this lecture.

RESULTS OF CONTROLLED STUDIES ON IMMUNIZATION

Shortly after the discovery of the virus of influenza A more than a decade ago, attempts were begun to immunize against the epidemic disease. Some of the early investigations produced suggestive evidence that a slight but measurable effect resulted from vaccination; other studies failed to reveal any reduction in incidence of disease. The early failures are now understandable in the light of newer knowledge.

It wasn't until the epidemic of influenza A in the winter of 1943-44 that the efficacy of vaccination against the natural disease was decisively demonstrated.[10-15, 8] This was accomplished by groups of investigators who collaborated under the Commission on Influenza of the Army Epidemiological Board. The results of that study have been widely publicized and discussed.

Approximately 12,500 men in Army Specialized Training Program units in universities in different parts of the country were involved in the study. Half of the men, alternately, received a single inoculation of the virus vaccine, and the remainder were given a control injection. In the majority of the university groups in which these studies were conducted the epidemic occurred within a few weeks after inoculations were completed. When illness occurred patients were hospitalized in accordance with routine Army regulations when they were found to have temperatures of 100 degrees or more. The epidemic period lasted about six weeks in each locality and when the results were finally tabulated it was found that 7.1 per cent of those who had received the control inoculation and 2.2 per cent of the vaccinated individuals had been admitted to the hospital with illnesses diagnosed as influenza. The findings in this study, which revealed that 3.2 times as many cases occurred in the controls as in the vaccinated, were the most conclusive obtained up to that time. They showed that subcutaneous vaccination exerted a distinct effect upon susceptibility to influenza during an epidemic.

On the basis of these studies, the decision was made by the Office of the Surgeon General to vaccinate the entire Army in the fall of 1945. An epidemic of influenza B, which had been anticipated, occurred throughout the United States, beginning in November. When the respiratory disease experience of the Army was compared with that of civilian groups and with that of other Service units in which vaccination had not been done, it was clear beyond doubt that the incidence of disease had been reduced. The significance of the trend was heightened by the uniformity with which the differences between Army and other groups were observed in various Service commands. During this epidemic opportunity for controlled observation was had at two universities in which it was possible to compare the incidence of illness in completely vaccinated Army units with that occurring in comparable groups of other Service units which had not been vaccinated. At the University of Michigan [16] during November and December, there were 109 admissions for acute respiratory disease from the unvaccinated group of 1100 men and only 7 admissions from the 600 men in the Army group. Thus the attack rates of 9.9 per cent and 1.1 per cent in the respective groups indicate that nine times as many cases occurred in the unvaccinated unit. At another university the effect was even more marked in favor of the vaccinated group.[17]

Attention is drawn once again to the observation that in the study conducted during the epidemic of influenza A in 1943, 3.2 times as many cases occurred among the controls as compared to the vaccinated; whereas during the influenza B epidemic in 1945 the unvaccinated group experienced nine times as many cases as did the vaccinated group. The more pronounced effect of vaccination in 1945 invites further comment. It may be that the preparations of vaccine used in 1945 were more effective, either by virtue of a greater virus content, possibly due to improved manufacturing experience, or that the Type B component of the vaccine is a better antigen than the Type A component. Still other factors may conceivably be responsible for the different ratio of cases in the vaccinated and unvaccinated groups observed in the two different years. However, there is another explanation that appears particularly attractive. It is in accord with well established principles and, if correct, it suggests a way in which the efficacy of vaccination may be enhanced. The basis for the explanation of the difference observed in the two years is as follows:

In the 1943 study, alternate individuals in each group were vaccinated; hence the populations under observation were comprised of equal numbers of vaccinated and control subjects who lived and worked together. In 1945, on the other hand, the populations under observation consisted of two separate groups in each of which the members were all either vaccinated or unvaccinated. The individuals in the respective groups lived and worked together for the most part. In other words, the difference between the two studies is in the way in which the control groups were set up in relation to the vaccinated. Not everyone becomes ill during an epidemic. Some escape exposure, while others have a degree of immunity, presumably residual, from a previous infection. If vaccination increases the resistance of the individual, then it is reasonable that in a group it would also reduce the number who would serve to transmit the disease to others. The suggestion is, therefore, that the more striking effect of vaccination observed in 1945 may have been due to the fact that in the vaccinated group all of the men had been immunized, while none in the control group had been so treated. Thus, since everyone in the treated group had been vaccinated, a further degree of protection was afforded by virtue of the reduced risk of exposure; moreover, the incidence of disease among the controls was uninfluenced by the presence of vaccinated persons. In 1943, however, not only was the vaccinated group subject to a greater exposure than in the 1945 study, by being interspersed among an equal number of unvaccinated individuals, but the unvaccinated group did not have as high an incidence of disease as would have been the case if vaccinated persons were not present. According to this view the 1945 observations support the impression gained from various observations during the 1943 study "that a comparison of attack rates in completely vaccinated populations with those of unvaccinated groups would demonstrate an even greater effect of vaccination than revealed in this (1943) study."[8] This may be another illustration of the principle established by experience with smallpox and diphtheria in which immunization of a sufficient proportion of the susceptible population has prevented the occurrence of epidemics.

THE DEGREE AND DURATION OF IMMUNITY

The foregoing comments may serve to indicate the complexity involved in attempting to formulate an accurate reply to the question "How effective is influenza vaccine?" The answer must be considered from two points of view. First, as it applies to the mass, and then as it applies to the individual. The indications are that vaccination will probably be completely effective in suppressing epidemics if a vaccine of adequate antigenic potency and active in stimulating antibody is given to a sufficient proportion of the population. Moreover, the effectiveness of the vaccine in suppressing epidemics will persist as long as there is maintained in the population a sufficient proportion of individuals with an adequate degree of relative immunity. The evidence suggesting the validity of this speculation was gathered in a study in an institution during the 1943 epidemic of influenza A which occurred one year after vaccination.[18] The effect was striking. It was observed that in wards in which 50 per cent of the inhabitants were vaccinated a year earlier only sporadic cases appeared, while in other wards in which vaccination had not been done rather sharp outbreaks occurred. Thus, one year after vaccination, the incidence of clinical disease among 1319 persons in the unvaccinated wards was 12.4 per cent, while among the 1916 in the partially vaccinated wards the incidence was only 1.9 per cent. That the difference observed could be attributed to the persistence of the effect of vaccination over a period of a year was further supported by serological studies which revealed that the antibody titers in the majority of vaccinated persons were still considerably above the pre-vaccination level even though they had declined somewhat from the maximum recorded two weeks after inoculation. The degree of persistence of the increased antibody titer following adequate vaccination appears to be of the same order as that following an attack of the disease.

As the question of the degree of efficacy of the vaccine applies to the individual rather than the mass, it is impossible to predict exactly how much immunity will be produced or exactly how long the effect will last, since the capacities of different individuals to form and to retain antibody vary widely. Since the degree and duration of immunity seems to be reflected in the level to which antibody titer is raised and maintained,[8] it may be said that the effect of vaccination in the majority of individuals probably persists for at least a year.[18] It should be realized, however, that even a high level of antibody does not assure absolute protection in the face of a heavy exposure to virus. Because of these variables the application of influenza vaccine should be considered less from the viewpoint of protecting a single individual and more from the viewpoint of protecting the entire group of which he is a part. Nevertheless, under any circumstances, a vaccinated person is likely to be less susceptible than one who is not vaccinated. Some day it may be possible, by a simple test, to determine the relative degree of immunity in an individual.

THE APPLICATION OF INFLUENZA IMMUNIZATION IN PRACTICE

The indications are clear that the efficacy of vaccination can be enhanced manyfold by vaccinating groups of individuals in constant association. By virtue of the protection afforded each individual there is the additional protection resulting from the reduced likelihood of exposure to an infected person. Under such circumstances it is as if a measure of environmental sanitation had been added to that of increased individual resistance. In the application of these principles one should consider not only school and occupational groups but the family unit as well.

Although the majority of vaccinated individuals will retain a considerable proportion of stimulated antibody through the year, information available at present indicates the advisability of re-immunization in the fall of each year in which a high risk of exposure is anticipated. This would be dependent upon the reliability of prediction based upon the epidemic cycle. It is possible that the interval between re-vaccinations may be extended somewhat longer when vaccination is applied to entire population groups, but how much longer is a problem still to be studied. It is safe to say that re-vaccination at 3 to 4 month intervals is unnecessary.

Even though only one injection is required, it is impractical to await the onset of an epidemic before using influenza vaccine. There are several reasons. The speed with which influenza spreads is too great to attempt to stop it by vaccination. About a week is required for the immunizing effect to become apparent, while the incubation period is a matter of 12 to 48 hours. Thus it would be futile to vaccinate those who had been in contact with a case in order to prevent the disease; and, moreover, the vaccine is of no value therapeutically.

Influenza Virus Vaccines: Before concluding these remarks something should be said about the vaccine itself and the side effects attendant upon administration. As you know, the Type A and Type B viruses for the vaccine are grown in the developing chick embryo. The extra-embryonic fluids of the embryo, which contains the viruses in high concentration, are rendered non-infectious by treatment with formaldehyde. In the studies that have comprised the basis of the present discussion, the vaccine employed was one referred to as the "Army" vaccine, or the vaccine "concentrated by adsorption-elution from embryonic red cells." The former designation is based on the fact that the vaccine was developed by the Army Commission on Influenza and was used in the Army before influenza virus vaccines were accepted by the National Institute of Health for civilian use. The other designation of the vaccine refers to the method employed for the concentration of virus, which is that of allowing the virus to be adsorbed by the red blood cells of the embryo, following which it is then released into a volume of physiological salt solution equal to one-tenth the volume of the extra-embryonic fluids.[19] Other methods for concentrating and purifying virus have been described, but vaccines prepared by the alternative methods have not yet had the benefit of field trials. Nevertheless influenza virus vaccines prepared by any method should be effective so long as they stimulate an adequate production of specific antibody. The alternative methods of purification and concentration involve adsorption of virus on calcium phosphate,[20,21] on protamine,[22] or on the precipitate formed by freezing and thawing the embryonic fluids,[23,24] or by high speed centrifugation.[25,26] Now that the efficacy of vaccination has been proved, it can be expected that many developments in the immunizing agent will appear.

The Side-Effects of Vaccination: One area in which some progress is in order is that of reducing or eliminating the slight discomfort that may occur the day following inoculation. A proportion of the vaccinated individuals in the Influenza Commission studies complained of headache, slight malaise, and slight chilliness that lasted several hours. About 1 per cent to 2 per cent had a temperature elevation as high as 101.5 degrees and symptoms sufficient to report to sick-call. At the site of inoculation, slight redness and tenderness may appear in some and may last about a day. In general the reactions appear to be no more severe than those following typhoid vaccination. In view of the fact that the reactions are attributable almost entirely to the concentration of the virus in the vaccine,[27] it may be possible to reduce the virus content and still have an effective immunizing agent. This possibility is being investigated, as well as the possibility of treating the virus in various ways with the objective of reducing or eliminating the side reactions.[27] This may soon be realized. Since the largest amount of experience with influenza vaccine, of the degree of concentration used in the Influenza Commission studies, has been had in adult populations, the optimal dose of such a vaccine for children has not been established. However, from the degree of systemic reactions observed in a limited experience, it appears advisable to reduce the adult dose proportionately.

One cannot leave the subject of reactions to influenza vaccine without repeating a warning that applies not only to influenza vaccine, but to all vaccine prepared from viruses or rickettsiae grown in the chick embryo. There are some individuals who are allergic to eggs. In such subjects serious anaphylactic reactions can result from inoculations of any vaccine of egg-origin. Therefore, egg-vaccines should be given with caution to those who have allergies, and should be withheld entirely from those who are known to be markedly egg-sensitive. Many individuals have received repeated injections of influenza vaccine without evidence of the development of sensitivity. Apparently the protein present is a poor antigen which does not sensitize. The risk of anaphylactic reaction seems to be less in a person previously inoculated without untoward effect than in one who is to receive his first injection. Rumors that influenza virus vaccines have caused hepatitis are unfounded.

Summation

Despite the many descriptions in the literature of the clinical aspects of influenza virus infections, the prevalent clinical tendency has not been to separate influenza from the large group of common respiratory disease, but rather to include them all in a single compartment even though the diverse etiologic character of the group is generally recognized. If influenza vaccine is to be used soundly and not exploited as a panacea, it is important that, in clinical practice, more consideration be given to respiratory infections from an etiologic viewpoint. The hope for the ultimate control of respiratory disease is to a large extent dependent upon the process of dissection of the various etiologic agents that contribute to this heterogeneous group of diseases and to define the separate role played by each. Theoretically, if one of the agents that contributes to this group of infections could be eliminated, the part attributable to the others might then be defined more easily. It might be pointed out that, in the course of experience derived during studies of influenza immunization, the impression has been gained that the influenza virus plays a much greater role, as a cause of respiratory disease, than had heretofore been considered. The extent and potential severity of influenza virus infections clearly indicate the need for an immunizing agent.

All that should be expected of influenza virus vaccine is that it will enhance the state of resistance, whereby the disease produced by the specific agents may be reduced in severity or be prevented entirely. On the assumption that the type of disease seen in 1918 was due primarily to a virus antigenically related to those contained in the vaccine, then it might be anticipated that the vaccine will be equally effective against such an eventuality. If total population groups could be vaccinated, or if a sufficient proportion could be so treated, it should follow, according to well established epidemiological principles, that the disease would not become epidemic and even the unvaccinated and those who did not respond to vaccination would be protected by virtue of the reduced risk of exposure. The application of influenza vaccination in this way for the purpose of preventing epidemics is a problem for the future. Until then an effort should be made to offer the opportunity to enhance the resistance of the individual and of family, school and occupation groups through the use of this latest addition to the armamentarium of preventive medicine.

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PUBLIC HEALTH PAYS DIVIDENDS

Figures have been prepared by statisticians of one of the large insurance companies showing that money spent to save lives through public health measures is a good dollars and cents investment. The dollars and cents value of a wage-earner or salaried person to his family dependents as a source of income, has been calculated by experts for men of various ages and different income levels. The figures show that the present worth of the net future earnings of a man who is now 30 years of age and whose annual income is $2,500, amounts to $32,300, for a man 40 years old with the same annual income, $21,300, and for one 55 years old, $6,100. For 40-year-old men in the $5,000 a year bracket, the value is $54,500, and for 55-year-old men, it is $18,700.

The life insurance statisticians, in calculating these values have deducted the man's own cost of living since only the remainder is of direct benefit to his dependents. If the figures were based on gross earnings they would be even higher.

Aside from the humanitarian importance of preventing needless suffering and death from preventable diseases, the dollars and cents value of public health measures which protect health and lives, is revealed in these figures.

CURRENT TRENDS IN MEDICAL CARE

The character of medical services in this country has changed appreciably in the past twenty-five years. A generation ago a large part of the problem was the control of contagious diseases which attacked particularly children and young adults (diphtheria, typhoid fever, tuberculosis, smallpox, and the diarrheal diseases of children, as examples). Many of these causes of death and illness have now been brought under control or practically eliminated. Thousands of individuals now live to middle or old age as a result of the control and prevention of these crippling and killing diseases of early life, which explains in large part the sharp alteration in the age distribution of the population. Today the major problems of medicine are those of middle and later life, of chronic diseases, early diagnosis and preventive therapy, the correction of disabilities, often chronic, and the rehabilitation of handicapped individuals through vocational, psychological, educational and medical treatment. —From *Current Trends,* Willard C. Rappleye, in *Medical Care, New York Medicine,* Aug. 5, 1946.

Medical Economics

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SINCE every branch of economics has to do with the creation and distribution of wealth, economic discussion inevitably involves self-interests and divergent viewpoints. Medical economics is no exception to this general rule; therefore, it is practically obligatory to try to be realistic and objective about what has occurred already in this field up to the present and what seems to be in prospect for tomorrow. Medical economics, precisely speaking, is a component of the broad field of health economics. For that reason the scope of the latter has been chosen as the starting point for this brief review of current developments in medical economics in this country.

HEALTH ECONOMICS

1. Population data. These include composition, distribution, occupations and income of the population.
2. General conditions affecting health. These include nutrition, housing, recreational facilities, community attitudes toward conserving health, and population control.
3. Security of income to purchase the necessities of life. This involves the temporary provision of income during sickness or unemployment of the wage-earner or self-employed, and long-term financial provisions for the aged, disabled, indigent and other insecure groups.
4. Incidence of illness. This includes frequency and kinds of illnesses, their curability and preventability, and the social responsibilities of the general public and professional groups for preventive and curative medicine.
5. Public health economics. This field includes administration and financing of standard public health procedures, with or without the force of law, to reduce disease and promote mental and physical health.
6. Medical economics. This special field of health economics includes availability of physicians, dentists, nurses, and hospitals, the ability of the public to pay for their services, and the applicability of the insurance principle to spread costs and improve distribution of such health services.

Every physician realizes that the increasing urbanization of our population and an industrial economy, coupled with a changing concept, in some quarters at least, of governmental responsibility for the total welfare of the individual, have been primary factors in a social movement of large proportions. It is true that this waxes and wanes with depression and prosperity but it moves steadily in the direction of greater participation by all members of society in the fruits of science and in the economic wealth of the nation. The statistics of population data call attention to evidence of economic and social needs, serving thereby as the background for the demands of various groups which have this desire in common—better and more secure living. The efforts to attain this objective constitute the social movement referred to.

The individual physician has understandable reasons to be distressed and even agitated in contemplating the possible effects of certain demands which, if acceded to, could radically alter medical practice as he has known it in the past. Realistic and sympathetic insight into this situation has been evidenced by Dr. Raymond Allen when he says, "Medicine, with its age-old concern for the sick—the poor as well as the rich, the weak as well as the strong, has been an influence for good surpassed only by the moral precepts of religion. The services of medicine, like those of religion, have been largely personal. While there will always be a need for personal services, medicine of the future, if it is to progress as a social as well as a biological science, must broaden its outlook and adjust its educational program accordingly. Medicine is coming of age as a social science in the service of society."[1]

General conditions affecting health, outside of environmental conditions resulting from public health activities, are related almost entirely to earning power and judgment of values when spending. Both are dependent to a considerable degree upon education, with its power to enhance the ability and the will of the individual to do for himself. The first point in the National Health Program of the American Medical Association recognizes the importance of self-determination in its consideration of "a minimum standard of nutrition, housing, clothing and recreation as fundamental to good health and as an objective to be achieved in any suitable health program." This program places the responsibility for the attainment of this standard upon the individual insofar as he can assume it, but it recognizes that, "the application of community efforts, compatible with free enterprise, should be encouraged with governmental aid where needed."

In spite of the fact that this country has more automobiles, telephones, and bathtubs than any other nation, these often-cited signs of material wealth and convenience have little meaning from the standpoint of intelligent spending, especially the proper apportionment of what income is available between food, clothing, housing, education and medical care, to indicate but some of the more important family expenditures. The increasing strain upon society to provide for over-age and worn-out individuals, the congenitally and otherwise disabled, and for those who are not endowed naturally to carry their part of the economic burden, may be accepted with equanimity. But, for the individual possessed of normal physical and mental capacities, who is healthy within the biological limits of his make-up, and educated to normal understanding of his responsibilities to conserve what he has and to provide for himself and his dependents, the most obvious need is to afford him adequate opportunity for earning. In the words of a current author, "Our traditions have been to permit as much freedom to the individual as is possible, in so far as the exercise of this function does not interfere with the rights of others, and does not produce a community hazard, or jeopardize the security of all . . . On the other hand, if we demand security *at any cost,* then it is obvious that we shall pay too high a price for it."[2]

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The province of public health is generally considered to include those activities that are undertaken for the prevention of disease and the promotion of health, where these are a community responsibility. Whether such activities are undertaken by governmental agencies at national, state or local levels, or whether they are carried on by voluntary health agencies, the obligation is the same—society undertakes to do for the individual what he cannot do for himself. It has been stated further, "The physician should be thoroughly familiar with the need for these activities. He should participate in them, but they are not his primary responsibility."[3] Public health practice, through its power to utilize effectively the contributions of other sciences such as bacteriology and chemistry, has been the greatest single factor in the conquest of communicable disease. It has led, thereby, to the prolongation of life and attainment of remarkable security of health of individual members of society as this may be affected by environment.

Although there are grounds for dissatisfaction with the incompleteness of coverage of the nation with public health facilities and trained personnel, the attainment of such coverage is feasible, it can be achieved at a reasonable cost, and would represent but a small fraction of the national expenditure for health conservation.[4] It has been estimated that complete modern public health units could be properly distributed at a per capita cost of $1.00 to $2.00 per person annually. Parenthetically, it is to be noted that adequate medical care is currently estimated to call for an expenditure of $20 to $30 per person per year. Although in 1942 the average expenditure per capita for public health services was 61 cents, many communities spent practically nothing for such services. In the President's message to Congress on November 19, 1945, he emphasized that forty million citizens live in communities lacking full-time local public health facilities. No one has advanced a valid objection to the expenditure of public funds, Federal as well as local, for the correction of the deficient distribution of public health services, or for the provision of properly trained personnel for their operation.

MEDICAL ECONOMICS

"The state of medicine in the United States is a social problem because the country's conscience has made it so—just as it has made social problems of food, shelter, and jobs . . . Suffering due to lack of food—and latterly to lack of proper medical care—can produce communtiy action in a way that other matters cannot and people who cannot find or pay for proper medical care are resentful, as are those who see the effects of such deprivations upon neighbors and, in the long run, upon the community."[5] This statement, which represents a popular point of view, indicates the necessity for employing the term socio-economic in the vocabulary of sociology, political science and medical economics. The social conscience, as it relates to health programs, cannot be more than an abstraction unless, through the application of economic science and reconciliation of viewpoints, there is tangible progress toward concrete results.

It has been stated with clarity and frankness that "economics and medicine were scarcely acquainted until an effort was made to unite them as medical economics . . . Economists struggled with problems of production, distribution and consumption of wealth and usually did not even include medical services under wealth. Medicine devoted its energies to the prevention, diagnosis and treatment of disease and was traditionally allergic even to discussions of financial transactions."[6] Now the two fields have grown so close together as to result in appointment to the direction of the Bureau of Medical Economic Research of the American Medical Association of the distinguished economist, Frank G. Dickinson, Ph.D. Discussions of the "right to medical care" have progressed to the point of its recognition within the Ten Point Program of the Association in its Health Program and Prepayment Sickness Insurance Plans.[7] The principal questions now under discussion are the following: (1) Can adequate medical care be provided for all without complete revamping of our present medical structure? (2) is it possible to achieve greater efficiency in providing medical care without cheapening its quality or disturbing the cherished relationship between the medical profession and the public? (3) what part of the national and individual income should be so expended and how should the costs be distributed? (4) what does the American public *want* when presented with the alternatives of compulsory sickness insurance and voluntary sickness insurance?

The answers to the first and last of these questions are the most controversial and will be left to the last for discussion. Only the most reactionary will defend in its entirety the institution we now designate as solo medical practice. It is the relic of another era when adequate medical care, more often than not, consisted of a visit in the home by the doctor, the deposition on the bedside table of some pills, and the dispensation of a diagnosis based more upon belief than upon knowledge—cost $1.00. Lest these seem to be harsh and ill-advised words, it should be added immediately that the need for family doctors is not diminished today, and, as a matter of fact, this need is one of the most pressing problems for solution. Yet the family doctor wants and is expected to practice good medicine and this he cannot do without access to expensive diagnostic equipment, laboratory facilities, and consultants. The principles and advantages of group practice are well understood by the profession and accepted by the public. Clinics, whether privately operated or operated at public expense as in certain fields of public health, may well be provided with the diagnostic facilities and technically trained personnel for their exclusive use. The reduplication of comparable facilities in the offices of physicians who are practicing by themselves is not only wasteful and costly to the patient, but it is not conducive to general sharing of medical information and the wholesome review of one's professional efforts. This is not to say that the medical needs of the public will be best served in the future by having all medical care supplied through clinics; it is to point out that the provision of diagnostic aids, just as the provision of hospital facilities, will be considered more and more to be a community responsibility, as recognized in the Hill-Burton Bill (National Hospital Construction Act). Young doctors graduating from medical school will not be confronted so often in the future with the necessity of a capital investment of $5,000 to $10,000 to add to the cost of their medical education, if they are debating the rewards and satisfactions of small versus large community practice.

The portion of the national income which should be expended for medical care may be viewed in the aggregate but it is misleading to do this without allowances for individual abilities to pay proportionate shares of the total cost. The national bill for medical care is now in the range of four to five billion dollars annually. Except for income groups below $500 and over $10,000 per year, the *percentage* of total income expended for medical care is almost constant at 3.5 per cent at the various economic levels.[8] Adequate medical care has been estimated to cost between $16 and $66 per person per year.[9] While the estimate by the United States Department of Agriculture is undoubtedly too low, and the estimate incorporated in the Bradbury Report may be too high, the following recent studies are in substantial agreement that $20 to $30 per person is the basic annual requirement.

Heller Committee of the University of California	$24.00
Heagerty Committee (Canadian Parliamentary Commission)	26.00
Lee-Jones Report	25.30
Bureau of Medical Economics	26.55

The experience of clinics offering voluntary prepaid complete medical coverage is in line with these figures, namely, that the cost of medical benefit approximates 50 cents per person per week, or between $2.00 and $2.50 per month. It would seem inescapable to conclude, therefore, that a large segment of the wage-earning and self-employed population either cannot, or is unlikely to be willing to meet such costs unless its income is increased or more fortunate members of society share the expense of the desirable medical coverage. These facts rather suggest that if the national expenditure for medical care remains the same and provision is made for up to one-half of the population to receive substantially more medical care than it is accustomed to enjoy, then the other half of the population is either to receive less in such services, or its medical bill will be increased. If the social movement previously referred to is to dominate the medical economics of the future one of two things must happen. Either economies must be effected through more efficient medical practice, or the national expenditure for medical care will have to increase.

It is no news to readers of this journal that influential groups are dissatisfied with progress toward achieving adequate medical care through voluntary methods. This is reflected in legislative proposals. There were before the 79th Congress which adjourned last summer, six bills pertaining to health which were passed, fifteen bills with similar implications which were acted upon but which died in committee, and forty-five bills which were not reported out of committee. There were introduced before the House of Representatives in the same session of Congress, eight bills with direct effects on medical practice which passed, fourteen bills which were acted upon but died in committee, and ninety-two bills with some implication concerning health activities which were not reported out of committee. In submitting his report from the Washington Office of the Council on Medical Service and Public Relations of the American Medical Association,[10] Dr. Joseph S. Lawrence calls attention to the fact that within the year 222 bills which were before Congress were judged to have greater or less potential effect on medical practice. Allowing for the repetition of the same intention in a series of bills, and for the introduction of identical bills in the two Houses, this is still a record for this type of proposed legislation on any congressional calendar. It developed, to a limited extent only, from the necessity to provide medical care for veterans of the late war.

The year 1945-46 saw yet other new departures in consideration of health matters at the highest level of government. In the first full-length presidential message on health ever submitted to Congress, President Truman, on November 19, 1945, urged that representatives of the American people give careful consideration to his proposal for the establishment of a national health program. The Chief Executive listed five important problems "which must be solved, if we hope to attain our objective of adequate medical care, good health, and protection from the economic fears of sickness and disability." These problems are: better distribution of both professional personnel and medical care facilities; improvement of public health services; promotion of medical research and professional education; development of organized payment for medical care; and protection against the economic risks of disabling illness. While it is true that only one of what were considered the most important bills to implement this program achieved passage, namely, the Hill-Burton Bill authorizing a nation-wide program of construction of hospitals and related facilities, it is also true that the remainder of those bills, including the Wagner-Murray Dingle Bills (S-1050 and S-1606) and the Pepper Bill (S-1318) for maternal and child welfare, may be revived at the next session of Congress. Their reintroduction in modified form is anticipated as a matter of course by political and medical observers. There has already been requested of the Republican National Committee that a national health program plank be incorporated in the platform of that party.[11]

Before leaving the subject of proposed and accomplished Federal legislation in the field of health programs in 1945-46, it is appropriate to comment on certain last-minute measures which were introduced before Congress adjourned. Senate Joint Resolution 177 proposed to raise the Federal grant for maternal health and child welfare to thirty million dollars under Title VII of the Social Security Act. Although the recommended appropriation was subsequently reduced by the Finance Committee to twenty-three million dollars, this amount did become an addition to the Social Security appropriation bill inasmuch as the Children's Bureau was recently transferred to the Social Security Board. Requests for an increased appropriation for the United States Public Health Service were disapproved, as was the Fulbright-Taft Bill which proposed a new executive Department of Health, Education, and Security, to be administered by a secretary of Cabinet rank. The latter action may be considered a set-back in the program to gather the health activities of the Federal government in one agency, and to hold that agency responsible for the now scattered activities pertaining to health which are within the jurisdiction of some six or seven major governmental jurisdictions.

By no means all recent activity in legislative bodies, which have exhibited an increasing concern about the public demand for sickness insurance has been at the Federal level. As Strow and Hirschfeld[12] point out, during the legislative sessions of 1945 more than thirty measures proposing cash sickness benefit plans or compulsory health insurance systems were introduced in twelve state legislatures. Other bills call for studies of health insurance. As remarked by Adele Stuckes,[13] throughout the course of the six years from 1939 to 1944, 116 bills were introduced in fourteen states as evidence of popular interest in compulsory sickness insurance. This may not represent public demand exactly but behind the fact itself lies the belief that present medical treatment is often inadequate, or too expensive, and that this results in large losses that could be prevented; that an economic barrier exists between the needs of the average patient and the medical services which are available.

It has developed, of course, that the demand for compulsory health insurance has been more consistent and more pronounced in some states than in others. In New York, for example, 27 health insurance bills were introduced in the legislature between 1935 and 1945. Yet in New York State there are better medical and hospital facilities, as well as provisions for social services, than in the average state. In the so-called underprivileged states where the need for more medical care is most acute, there has been practically no organized demand for compulsory health insurance. This lends credibility to the claim that demands for revision of the structure of medical care have arisen, not so much from the maldistribution of physicians, those rendering ancillary services, and hospitals, as they have from the need for more equitable financing of the costs of medical care. The unduly heavy financial burden which sickness throws upon some families is a matter for concern in both sparsely and heavily populated areas, in rich states and poor states alike.

As to what the American public wants, it is now being encouraged to consider the relative desirability of compulsory sickness insurance, which conceivably can be imposed at any level of government, and voluntary sickness insurance, which, if it is to meet the national health problem, requires widespread public acceptance as well as enlightened planning and administration. The results of a recent inventory indicate that 63 state and other medical society sponsored prepayment medical care plans are operating in 25 states. Enabling acts by state legislatures have passed, or are in prospect, in yet other states. The total number of persons covered, within the limits imposed by the considerable variety of policies, is estimated to be about four million persons. Taking into account the wage-earners who are afforded some sort of health coverage in connection with their employment, other individuals and their families who are enrolled in cooperative medical care organizations, and those purchasers of sickness insurance policies on an indemnity basis through private insurance carriers, the total number of persons who now have some sort of sickness and accident insurance now may be about 40 millions of the population.[14] This includes subscribers to Blue Cross hospitalization plans.

Such tangible evidence of the progress of voluntary sickness insurance is to be viewed in relation to the activities of certain consuming groups. Either through impatience with the rate of this progress, or skepticism as to the eventual net results, such groups have shown the intention to take matters into their own hands. Thus, even though the availability of voluntary sickness insurance has increased quite rapidly within the past five or six years, labor in particular, but other rather homogeneous groups as well have been seeking their own solutions for the problems which seem to be left over as voluntary plans move cautiously ahead. A few groups have been successful in achieving, or in improving their prospects of doing so, some measure of their desired security in medical care. Sometimes this has been through access to tax-money, as in the case of the Senior Citizens of the state of Washington. In one instance so far, it has been through a levy on the public as it must purchase a particular necessity of life; this refers to the Health Fund of the United Mine Workers.

Others press for desired advantages. Rural people have made known their demands for more doctors, nurses, and dentists in their communities, more hospitals and better facilities, more preventive medicine and public health, easier ways of paying their doctor bills, and all the benefits of "first class modern medical science."[15] Such groups are not concerned so much perhaps with the controversial significance of the four and one-half million young men who were found to be unfit for military service during the war, as they are with the findings of the Farm Security Administration that low income farm people exhibit a 14 per cent incidence of varicose veins and that such correctible conditions as hernia, hemorrhoids, and post-natal damage to the birth canal are both common and disabling among rural families.

To face the facts squarely, the American people cannot be said to be solidly behind either compulsory or voluntary sickness insurance. Part of this indecision is due to ignorance concerning what they are being asked to consider and part to lack of opportunity to sample, if you please, any form of extensive sickness insurance. Agreed that it is a debatable point whether a considerable portion of the public, especially our rural population, can be induced to provide voluntarily for its adequate sickness insurance, one cannot be too sure about this—not until well-conceived and comprehensive plans have been devised to offer such protection, and cost-sharing and buying have been encouraged through educative measures. There is a dilemma which confronts medical leaders as they seek to assist in broad planning in medical economics. It is generally agreed that comprehensive medical care can scarcely be provided at less than a cost of $20 to $30 per person and this totals up to a cost to the family of four of $80 to $120 yearly. It has been difficult enough to sell limited medical coverage costing only $2.00 to $4.00 for such a family per month through large organized groups and with the assistance of good sales organizations. This is in spite of the fact that such insurance is specifically designed to protect against the financial burdens of so-called catastrophic illness. With no intention of conveying the impression that less than comprehensive coverage should be our ultimate goal for a large part of the population, it still seems logical that the average citizen should welcome even limited coverage, at least judging by the analogy to insurance on one's home or automobile. One is strongly tempted to conclude that the trouble lies with the lack of availability of any plan to many individuals, public inertia about accepting the principle that voluntarily sickness insurance is desirable, and professional lethargy about examining trends and helping to shape the course of medical practice as popular demands and social trends impinge upon it.

One danger at the moment is that, pending the development of more comprehensive prepayment medical coverage plans and the education of the public to buy this coverage, special interest groups may succeed in taking care of their personal needs without concern for the rest of the public, including individuals with low income, which must foot the bill and may not have its own position improved in the process.

The intention of this review was not to attempt to offer an easy and inexpensive scheme for solving the problems of physician distribution, the costs of medical care, or the social and general economic problems which beset most of us. Yet it is to be hoped that physicians and others contributing professional services in the conservation of health have become increasingly conscious of the ever larger responsibilities of their calling. Medical economics as related to the welfare of the community, as well as to the personal relationships between physician and patient, has achieved importance second only to intelligent preservation of medical ethics. Let the serious question be raised whether, "Today, the final test of the 'goodness' or 'badness' of medical ethics, as of drugs, appliances and methods of treatment, is found in morbidity and mortality statistics."[16] Isolated statistics of themselves never approach in importance the trends of statistics. The problem is to accelerate trends which are desirable.

If adequate medical care for all is established as a social responsibility of the nation, just as is the right to the benefits of public health practice, then as physicians we should help to prepare and cooperate in a program to:

1. Coordinate community medical practice around the improved hospital and diagnostic facilities anticipated to result from the passage of the Hill-Burton Bill.
2. Employ effectively the services of all physicians, but of younger physicians especially, as they show the willingness to participate as members of voluntary plans or subsidized programs where required, to redistribute physicians to areas of need as promptly as possible.
3. Educate the general public about the costs inherent in adequate medical care and the opinion of most doctors that voluntary sickness insurance is more likely to afford the type of medical care which the same public has come to expect than is compulsory insurance for the same purpose.
4. Develop at an accelerated pace, comprehensive, or at least more comprehensive, prepayment medical care facilities and see to it that these are made available to everybody who may reasonably be expected to pay for this sickness insurance.
5. Irrespective of the future growth of voluntary sickness insurance, to prepare ourselves for greater expenditure of public funds in the future, by national, state and local agencies on a matching basis, for the extension of medical care and hospitalization to those needing it but unable to pay.

Above all, in our concern lest the quality of medicine deteriorate, and our pride and professional satisfactions suffer in the process of trying to adjust our total wealth in medical resources to satisfy the needs of all, let us be reminded to live up to the tribute to the doctor by Stevenson which begins, "There are men and classes of men that stand above the common herd; the soldier, the sailor, and the shepherd not infrequently; the artist rarely; rarelier still, the clergyman; the physician almost as a rule . . . "

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Public Health Cancer Control

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Cancer control is a problem of education, research, and service. To be effective, it must represent cooperation between the voluntary and official health agencies, the hospitals, practicing physicians, medical schools, and research institutions. None of these groups working singly can be effective in lowering cancer morbidity and mortality, but through their cooperative effort, possible gains are in order.

The American Cancer Society with a branch in every state is the largest single voluntary cancer control group. Composed of physicians and laymen, it was started, as so many of these organizations were, by physicians who felt they would have a better chance of eradicating cancer if the patients reported earlier. Laymen, frightened by the rising cancer death rates, readily agreed to cooperate in the effort. Later, research was incorporated in the program, also service to the patient.

I have been interested in the cancer control movement since my intern days. The chief of our surgical staff aroused my interest then and I was privileged to attend many of the early meetings of the American Society for the Control of Cancer as it was then known. Looking back through the years, it is evident that while many of our hopes have not materialized, nothing has replaced the concept that early recognition of cancer, while it is still confined to its place of origin, will result in cure, provided it is located in an accessible site.

The public health aspect of the cancer control program is being clarified. In the early days, many public health authorities felt that aside from record keeping, cancer control was not a public health problem. They pointed out that it involved diagnosis and treatment of individual patients which was outside the scope of public health activity. Some health departments provided diagnostic service for biopsies and tissues removed at operation, while others set up special record divisions which aided hospitals and local health services in compiling more accurate cancer statistics.

Diagnosis and treatment of individual patients has been assumed by some health departments through the development of cancer clinics and hospitals for indigent cancer patients. Although the latter seems to be definitely outside the field of public health service, cancer detection centers, involving case finding as they do, apparently are considered part of the program of public health service.

Cancer education of the people is a definite public health problem. It has had its ups and downs, largely because it is difficult to teach people facts about cancer. Various media have been tried, including the newspaper, radio, lecture, pamphlet, and courses of instruction in schools. In one study, it was found that more information was gained by the people from reading about cancer in the newspaper than from any other source, as the newspaper is the only universal medium of communication between people which has lasting value. A radio talk or a lecture may be heard and forgotten, but a newspaper account can be reread or filed.

Until recently, many newspapers would not carry information about cancer, and it is still an acknowledged fact that they hesitate to report that anyone has died of cancer. Apparently the fear of cancer is so great that should the diagnosis be in error or the family feel that this was an undue exposition of facts, a suit might be filed against the owners of the paper. The American Cancer Society should be credited with changing public opinion to such an extent that most newspapers gladly report cancer information and devote a great deal of space to recording the results of cancer research.

Cancer education of young people is an effective means of associating cancer knowledge with instruction in high schools and colleges. Students do not find it difficult to understand the cell theory of cancer as a result of their studies in biology; radiation concepts are associated with their lessons in physics, while the problems of cancer detection, treatment, and research are related to sociology and the study of community problems. High school boys and girls also are the future research workers in cancer and other fields and if their interest can be stimulated early in their careers, it will supply personnel for the research institutions in the future.

Some physicians criticize the efforts of the American Cancer Society to educate the people because of the neurotics which develop in its wake. This is putting the cart before the horse as most hypochondriacs suffer from anxiety states independently of any health education effort. As Dr. E. L. Tuohy has said, "The majority of persons who are reached by health education are the anxious type who report promptly for minor complaints, while the cancer victims are too often so-called "well adjusted" people who do not pay any attention to disease warnings." In the long run, cancer education does more good than harm in the opinion of those who have made a study of the question.

Does cancer education result in patients consulting physicians earlier and in patients receiving treatment more promptly? Yes, it does. Delays are classified as lay and professional and where studies have been made, it has been learned that physicians are responsible for part of the delay as well as patients. Women tend to delay less than men, and physicians in certain areas of the country have shortened the professional delays by cooperating with the teachings of the American Cancer Society. The scientific story that the Cancer Society is trying to tell is the concept of organized medicine and it represents a standard of practice which physicians are expected to maintain. Some physicians have been upset by patients coming to see them because they thought they had discovered a breast lump. They scolded the patients for being apprehensive even though the women brought circulars with them indicating that the check-up was upon the recommendation of the American Cancer Society. Patients who report with symptoms which may indicate cancer should be treated with kindness, courtesy, and consideration when it is recalled that the best medical minds believe this is our only chance of decreasing the death rate in cancer.

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The most important person in cancer control is the physician who first discovers the suspicious lesion, for if it is a condition which he cannot treat, the patient should be referred to someone who can take care of it. Cancer detection in the beginning stages is a difficult diagnostic feat, and many mistakes are made both ways. When a woman discovers a definite lump in her breast and the physician finds the same lump, the chances are that in 50 per cent of the cases it will be benign and in 50 per cent it will be malignant; but in the majority of cases, it will be impossible for the physician to predict in advance which it will be, in fact, not until the pathologist has the lump in his hand and in some cases not until the section is made can an absolute diagnosis be made.

Surface and orificial malignancy frequently results from occupational exposure and as such it is a public health problem. Lumberjacks, sailors, and farmers tend to develop cancer of the skin and lip from exposure to the sun and wind and a large number of chemicals used in industry also may produce cancer unless certain precautions are observed.

Cancer of the skin can develop following contact with arsenic, tar, carbon black, soot, pitch, oils, and other agents. Chimney sweeps in England formerly developed cancer of the groin region from irritation of the spot on the skin, but with the improvement in hygienic conditions for these workers, and developments in chimney construction, the numbers of such cancer has declined.

Cancer of the mucous membrane of the nose may result from exposure to chromates, nickel carbonyl and radioactive substances. Cancers of the bronchi and lung can develop from irritation with arsenic, soot, tar, and radioactive materials.

The only form of cancer which apparently is on the increase is cancer of the lung and suggestions have been offered that tar irritation from excessive smoking is a factor. Inhalation of dust containing radioactive materials is known to produce cancer of the lung in certain miners.

Cancer of the bladder and kidney has followed exposure to benzidine and aniline. Blood disorders develop after exposure to benzene and radioactive particles.

W. C. Hueper, Warner Institute of Therapeutic Research, New York City, recommends the establishment of a special institute for the study of occupational cancer. Industry is meeting the problem by better exhaust ventilation systems, walls and floors that can be cleaned easily, and by the removal of special irritants before they are discharged into the air. Workers should wear special clothes and masks, and shower baths and special rooms for eating and storing street clothing should be provided.

Occupational cancer is well known in all parts of the world; men in the tropics who carry loads for long distances keep up their endurance by chewing betelnut, and as the leaf is mixed with lime and held in the mouth at one point, this causes irritation and cancerous growths follow. Kangri cancer develops in the skin of the abdomen from irritation of a charcoal brazier which is worn under a long coat to keep the shepherds warm as they watch their flocks in Tibet.

A simple way to produce cancer in the laboratory is by chronic irritation with heat, radioactive substances, or chemicals, and elimination of these hazards in industry will prevent certain human cancers.

About 2 per cent of patients above the age of 16 who enter voluntary hospitals have malignant disease. The incidence in children is said to be lower. Cancer patients treated in physician's offices are limited to surface malignancies while some patients who never enter a hospital are confined to their homes with advanced malignancy. The majority of cancer records, therefore, are to be found in hospitals, and if they are well kept, a great deal of information can be obtained about the disease. In Connecticut, the health department has established a special record service which cooperates with hospitals and physicians in compiling better records and, as a result, the Connecticut cancer records are superior.

It is perfectly obvious that when a hospital staff compiles good cancer records and studies them they gain much first-hand information about the disease, as the average physician does not see many cancer patients during the year. One cancer death occurs each year in every 700 or 800 people and as at one time physicians were distributed in about this ratio, cancer deaths could be calculated on the basis of one death for every physician in practice. It also is estimated that for every death there are two or three new cases which develop each year. As the death rate from cancer is high because of late reporting and inaccessible sites of origin, the average physician's experience with cancer may be disheartening, and it is not until good records are kept with a follow-up on each patient that the more optimistic side of cancer is revealed, as a surprising number of cancer patients are alive and well many years after the disease is eradicated. Health departments, by assisting with record keeping and patient follow-up, can render a signal service to the cause of cancer control and to the cancer education of the physician.

Many public health departments are considering the possibility of giving assistance in the development of cancer detection centers, of which there are several types. In one variety, physicians from the hospital staff meet once a week at the hospital to see patients who suspect they may have cancer. No treatment is given and the examination varies somewhat with the center, but all patients are referred back to their own physician. There is another type of detection center in which the same persons are examined at regular intervals for possible malignancy. Then there is the consultation-type of service in which any patient is referred for opinion.

Cancer detection center entrance requirements vary. In many places, it seems ideal to have the patients come directly, while in others, physicians make the referrals. In any event, the patients are sent back to their own doctor and no information is given by the clinic to the patients. In the center, a registration fee of $5 is charged for the support of the cause, but this may be waived if the patient is unable to pay. There is no attempt to charge for individual diagnostic procedures. Because cancer is relatively uncommon, it is necessary to examine a large number of people before much malignancy is found. In some instances, the growth is a large silent one in an internal organ, and not easy to treat.

The public has been given a set of signs and symptoms which may indicate cancer, and they have been urged to be examined at regular intervals, even if they do not have any sign of disease. The advantage of coming when growths are small is stressed and the public has been very willing to cooperate with the cancer detection idea. This is a challenge to the medical profession which can be met with public health assistance through local medical organizations.

Physicians should take a special interest in the public health cancer control program, representing as it does an effort to lower the cancer morbidity and cancer mortality rate. For established cancer, many technical procedures now are available and in some forms many permanent cures are obtained. The American Cancer Society, composed of lay and professional persons, is under the direct control of the medical profession in its policies and program. This is not only true at the national level, but the local also. Physicians should take an interest in this organization and contribute their time and money to its support. In essence, it is a pressure group which is trying to do something about the cancer problem. More recently, state and local health departments have received money for cancer control through the United States Public Health Service, and, in many cases, combined programs are being arranged between the health department and the state divisions of the American Cancer Society.

In spite of the fact we have been trying for some time to solve the practical aspects of the cancer problem, many questions remain unanswered, largely in the area of cancer detection. The public health interest in cancer control, embracing as it does education and to a certain extent service, should develop hand in hand with the research program which is trying to solve the fundamental problems. The wholehearted cooperation of the medical profession is necessary for the success of the public health program of cancer control.

FELLOWSHIPS IN HEALTH EDUCATION FOR 1947

Fellowships leading to a Master's Degree in Public Health in the field of Health Education are being offered to any qualified United States citizen between the ages of 22 and 40, according to a statement released by the United States Public Health Service, Federal Security Agency. Tuition, travel expenses for field training and a stipend of $100 a month will be provided out of funds furnished by the National Foundation for Infantile Paralysis.

Candidates must hold a bachelor's degree from a recognized college or university and must be able to meet the entrance requirements of the accredited school of public health of their choice. In addition to the degree, courses in the biological sciences, sociology, and education may be required. Training in public speaking, journalism, psychology, and work in public health or a related field are considered desirable qualifications.

The year's training, which begins with the 1947 fall term, consists of eight or nine months academic work including: public health administration, epidemiology, public health and school health education, problems in health education community organization, and information techniques, and three months of supervised field experience in community health education activities.

Application blanks may be obtained by writing the Surgeon General, United States Public Health Service, Washington 25, D. C., and must be filed prior to March 15, 1947.

Veterans are encouraged to apply and will be paid the difference between their subsistence allowance under the G. I. Bill of Rights and the monthly stipend of $100. Employees of local and state health departments are not eligible since federal grants-in-aid are already available for such training purposes.

LARGE-SCALE DIABETES EXPERIMENT

The 5,100 residents of Oxford, Massachusetts, have agreed to submit to a novel four-month experiment by the U. S. Public Health Service designed to check the spread of diabetes by means of blood and urine tests. A ten-man medical team is conducting the survey. —*Victor News,* November, 1946.

Diphtheria in Minnesota

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CLINICAL CONSIDERATIONS

CLINICALLY, diphtheria in Minnesota is unchanged. It remains a treacherous and deceptive disease, killing early by suffocation or later by sudden death, even during apparently well-established convalescence.

Diphtheria is caused by the Cornybacterium diphtheriæ of Klebs and Loeffler, gram-positive, nonmotile, and nonspore-forming. The bacteria have little resistance to antiseptics and die out in a few days if sprayed as a dust into an ordinary sunlit room. Cultures from humans must be taken carefully, and from involved areas to avoid false conclusions. The presence of the disease is not ruled out by negative cultures nor necessarily proven by finding positive cultures. Stimson states that 20 per cent of the initial cultures taken in cases of clinical diphtheria may be negative and it is common to find healthy carriers of diphtheria bacilli. Diphtheria bacilli, when growing in the throat or in artificial culture media, produce a soluble exotoxin which, when injected into susceptible animals, including humans, causes death. This toxin is produced in varying quantity by the different strains of true diphtheria bacilli, alike in other cultural respects, and thus these strains are said to have widely varying amounts of virulence. They may produce toxin in great amount or none. While virulence of diphtheria bacilli seems related to the morphology, inasmuch as organisms with distinct bulging granules are customarily virulent strains, the most reliable method of demonstrating virulence is a test performed by injecting pure cultures of the isolated organism into guinea pigs. The toxins of different virulent diphtheria bacilli appear to be identical for all strains so that the antitoxin produced by immunization of horses with a single toxin neutralizes all diphtheria toxins.

Diphtheria occurs in all parts of the world, increasing usually in winter months. Abnormal conditions of the nose and throat are important contributing factors in determining infection, which usually follows contact with cases of the disease or with healthy carriers of virulent organisms. Milk-borne outbreaks have been reported and mechanical transmission of the organisms has been traced to cats whose fur had been contaminated. The proportion of the population who may be found to be carriers of diphtheria bacilli varies considerably with age and prevalence of clinical cases in the community. Routine swabbing might show 10 per cent of persons to be carriers, though the majority of cultures would prove to be nonvirulent organisms.

Enlarged or diseased tonsils apparently act as a contributing factor in the contraction of diphtheria and also as a site of infection in chronic carriers. Tonsillectomy is thus the most effective means of clearing up a carrier condition. As pointed out by Stimson, diphtheria superimposed on the raw field of a tonsillectomy is usually very malignant and before this operation is performed upon a child, the child should be shown to be Schick negative, or immune to diphtheria, or to be free of diphtheria bacilli.

When diphtheria bacilli grow in a host susceptible to the disease, the toxin formed causes necrosis of the underlying mucous membrane, thus furnishing more soil for further growth of the bacilli and in turn for production of more toxin. While the bacteria do not invade living tissue, the toxin is readily absorbed, and thus the disease has characteristic lesions locally and systemically, or generally. The local lesions constitute the pseudomembrane, usually found on the tonsils, soft palate, uvula, and nasopharyngeal wall. The diphtheria bacillus seems to have an affinity for the respiratory mucous membranes, and the diphtheritic pseudomembrane may extend throughout the nose, larynx, trachea, and even the bronchi. The local lesion is of greatest importance when situated in the larynx.

The systemic lesions, resulting from absorption of toxin, are characterized by toxic degeneration first of the viscera, particularly of the heart and reticulo-endothelial system, and secondly, of the central nervous system, especially of the cranial and peripheral motor nerves. As the toxemia progresses, ordinarily the heart muscle fibers fail first, and general symptoms of myocardial insufficiency are present. Degeneration of the conducting system and vagus nerves results in pulse irregularities and breaks in conduction. The action of the toxin on the central nervous system early results in local paralysis during the first week or two, particularly of the cranial nerves. Later, even six to eight weeks after onset, a generalized paralysis appears, resulting from widespread degeneration in the brain and cord as well as in the nerve fibers.

The incubation period of diphtheria is one to seven days. The onset is usually not abrupt or severe. For all forms, the diagnosis is aided by the appearance of the membrane, the response to antitoxin, the previous reaction of the Schick test, and the cultural findings.

Nasal diphtheria usually begins like a simple head cold, with little or no fever, and malaise. Characteristically, a serosanguineous discharge is present or hemorrhage may occur. Since absorption of toxin from the anterior part of the nose is poor, constitutional symptoms may be slight; the diagnosis is frequently overlooked and the patient is in great danger for some days. Administration of diphtheria antitoxin cures the condition promptly.

Pharyngeal diphtheria varies markedly in signs and symptoms according to the severity of the infection. If untreated with antitoxin, the course of the disease may go on to death in six to ten days, or the membrane may disappear in eight to ten days, and the patient go on to a long and stormy convalescence with marked evidence of the effect of the toxin upon the heart and nerves. But following the administration of a sufficient dose of diphtheria antitoxin, the membrane ceases to spread and within twelve hours is appreciably smaller in extent and disappears in two or three days. The fever usually returns to normal nearly as quickly and, in uncomplicated cases, the constitutional symptoms are soon gone.

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Laryngeal diphtheria occurs in about one-fourth of all cases, and most commonly in young children. Diphtheria of the larynx is always serious because of the mechanical obstruction to breathing. There is, however, less likelihood of absorption of toxin or complicating paralyses which occur in other forms where the growth of the membrane is more extensive and prolonged. In laryngeal diphtheria, without antitoxin and surgical intervention, exhaustion appears, the child becomes comatose, and may die as early as the third day of the disease.

Multiple or extensive cases of diphtheria occur in patients with little immunity or resistance and are characterized from the onset by severity and overwhelming toxicity. The diphtheritic process may involve the mucous membranes of several general areas, and secondary infections and complications are common. Massive early doses of antitoxin are essential if recovery is to occur.

Diphtheria is also classified on the basis of severity or extent of involvement. Simple cases have mild local and general manifestations. Toxic cases have signs of marked absorption of toxin producing prostration, fever, myocarditis. Septic cases have severe local infections with extensive membrane and extension of the involvement to adjacent organs such as the ears or sinuses.

The complications and sequelae of diphtheria result from secondary infection as with a streptococcus; from the extension of the diphtheritic infection to the lungs or ears; and from the effect of absorbed toxin on heart and nerve tissues. Late circulatory failure occurs usually during the third week, after the height of disease is past, and when the patient seems well on the way to recovery. The electrocardiogram is of great value in detecting myocardial damage. Nerve paralyses are more common when the administration of antitoxin has been delayed as long as four days from the onset of illness. Paralyses may appear at any time after the first week and as late as the ninth week, long after the patient has apparently recovered, and may spread rapidly to involve many different groups of muscles. Death may occur from respiratory paralysis.

Prognosis in a case of diphtheria must always be guarded. The earlier the administration of antitoxin, the more rapid and sure is the recovery. When antitoxin is given on the first day of this disease, practically no cases die. The skill and judgment of the doctor are extremely important in influencing the prognosis of this disease.

The treatment of diphtheria is both specific and general. Specifically, diphtheria antitoxin given by whatever route checks further damage to the organism by the toxin. Toxin quickly combines with the tissues, where it is unaffected by antitoxin, and thus it is imperative to give antitoxin at the earliest possible moment. The dosage of antitoxin for the treatment of diphtheria should never be less than 5,000 units, and it is seldom necessary to give more than 80,000 units, particularly if one-half of this is given intravenously. The total amount of antitoxin needed should be given at the first injection. A child should receive nearly as much as an adult because the disease in a child is relatively more severe. If diphtheria is merely suspected, antitoxin should be given at once, and the diagnosis established later.

TABLE 1

REPORTED CASES, DEATHS, CASE-FATALITY RATES, MORBIDITY AND MORTALITY RATES FROM DIPHTHERIA IN MINNESOTA, 1890 TO 1945, INCLUSIVE

Year	Cases	Deaths	Case-Fatality Rate (Percent)	Case Rate per 100,000 Pop.	Death Rate per 100,000 Pop.
1890		772			58.9
1900		584			33.3
1901		784			43.9
1902		549			30.2
1903		338			18.3
1904		359			19.1
1905		353			18.4
1906		358			18.4
1907		399			20.2
1908		574			28.5
1909		557			27.3
1910	5012	566	11.2	241.5	27.3
1911	3309	335	10.1	157.1	15.9
1912	1877	173	9.2	87.8	8.1
1913	3189	215	6.7	147.0	9.9
1914	4683	354	7.5	212.8	16.1
1915	2587	200	7.7	115.9	9.0
1916	2502	170	6.7	110.6	7.5
1917	3910	254	6.4	170.5	11.1
1918	3674	285	7.7	158.0	12.3
1919	4541	302	6.6	192.7	12.9
1920	3616	243	6.7	151.5	10.3
1921	4385	222	5.0	182.3	9.2
1922	4269	191	4.4	176.2	7.8
1923	4431	211	4.7	181.6	8.4
1924	3941	218	5.5	160.3	8.6
1925	3779	232	6.1	152.7	9.0
1926	2957	156	5.2	118.6	6.0
1927	1935	82	4.2	77.1	3.05
1928	1363	73	5.3	53.9	2.7
1929	1124	65	5.7	44.1	2.5
1930	768	32	4.1	30.0	1.2
1931	859	38	4.4	33.2	1.5
1932	649	24	3.7	24.9	.93
1933	552	25	4.5	21.0	.96
1934	624	16	2.5	23.5	.61
1935	500	17	3.4	18.7	.65
1936	427	17	3.9	15.8	.64
1937	364	13	3.5	13.4	.49
1938	286	12	4.1	10.4	.44
1939	188	11	5.8	6.8	.40
1940	122	6	4.9	4.4	.21
1941	129	7	5.4	4.6	.25
1942	139	12	8.6	5.0	.45
1943	375	20	5.3	14.5	.78
1944	508	16	3.1	20.2	.64
1945	476	22	4.6	19.1	.88
1910-1914	19070	1643	8.8		
1920-1924	20642	1085	5.2		
1930-1934	3452	135	3.9		
1940-1944	1273	61	4.0		

The general treatment of diphtheria aims at preventing any strain of a damaged heart and the symptomatic

TABLE 2

MINNESOTA DIPHTHERIA CASES AND DEATHS, 1918-1945, INCLUSIVE, BY AGE GROUPS WITH CASE-FATALITY RATES AND PERCENTAGES

	Under 5 Years					5 to 14 Years					15 Years and Over					Total	
Year	Cases	% of Total	Deaths	% of Total	Fatal. Rate	Cases	% of Total	Deaths	% of Total	Fatal. Rate	Cases	% of Total	Deaths	% of Total	Fatal. Rate	Cases	Deaths
1918	654	17.8	91	32.5	13.9	1560	42.5	116	41.4	7.4	1460	39.7	73	26.1	5.0	3674	280
1919	694	15.3	113	37.4	16.3	2134	47.0	122	40.4	5.7	1713	37.7	67	22.2	3.9	4541	302
1920	509	14.1	81	33.3	15.9	1789	49.5	109	44.9	6.1	1318	36.4	53	21.8	4.0	3616	243
1921	625	14.3	79	35.9	12.6	2416	55.1	104	46.8	4.3	1344	30.6	39	17.3	2.9	4385	222
1922	617	14.5	79	41.4	12.8	2324	54.4	82	42.9	3.5	1328	31.1	30	15.7	2.3	4269	191
1923	677	15.3	75	35.5	11.1	2384	53.8	104	49.3	4.4	1370	30.9	32	15.2	2.3	4431	211
1924	715	18.2	92	42.2	12.9	1948	49.4	91	41.7	4.7	1278	32.4	35	16.1	2.7	3941	218
1925	703	18.6	78	33.6	11.1	1712	45.3	109	47.0	6.4	1364	36.1	45	19.4	3.3	3779	232
1926	557	18.8	60	38.5	10.8	1411	47.7	71	45.5	5.0	989	33.5	25	16.0	2.5	2957	156
1927	401	20.7	34	41.5	8.5	812	42.0	26	31.7	3.2	722	37.3	22	26.8	3.0	1935	82
1928	237	17.4	35	47.9	14.8	586	43.0	24	32.9	4.1	540	39.6	14	19.2	2.6	1363	73
1929	173	15.4	30	46.1	17.3	478	42.5	23	35.4	4.8	473	42.1	12	18.5	2.5	1124	65
1930	131	17.1	13	40.6	9.9	275	35.8	8	25.0	2.9	362	47.1	11	34.4	3.0	768	32
1931	103	12.0	11	28.9	10.7	373	43.4	12	31.6	3.2	383	44.6	15	39.5	3.9	859	38
1932	95	14.6	9	37.5	9.5	274	42.2	8	33.3	2.9	280	43.2	7	29.2	2.5	649	24
1933	70	12.7	10	40.0	14.3	229	41.5	5	20.0	2.2	253	45.8	10	40.0	4.0	552	25
1934	58	9.3	5	31.3	8.6	204	32.6	6	37.5	2.9	362	58.0	5	31.2	1.4	624	16
1935	39	7.8	5	29.4	12.8	236	47.2	7	41.2	3.0	225	45.0	5	29.4	2.2	500	17
1936	31	7.3	5	29.4	16.1	167	39.2	7	41.2	4.2	229	53.5	5	29.4	2.2	427	17
1937	25	6.9	7	53.8	28.0	110	30.2	3	23.1	2.7	229	62.9	3	23.1	1.3	364	13
1938	38	13.3	5	41.7	13.2	105	36.7	5	41.7	4.8	143	50.0	2	16.6	1.4	286	12
1939	15	8.0	3	27.3	20.0	61	32.4	2	18.2	3.3	112	59.6	6	54.5	5.4	188	11
1940	19	15.6	3	50.0	15.8	35	28.7	1	16.7	2.9	68	55.7	2	33.3	2.9	122	6
1941	24	18.6	4	57.2	16.7	45	34.9	1	14.3	2.2	60	46.5	2	28.5	3.3	129	7
1942	29	20.9	6	50.0	20.7	37	26.6	3	25.0	8.1	73	52.5	3	25.0	4.1	139	12
1943	62	16.5	11	55.0	17.7	127	33.9	2	10.0	1.6	186	49.6	7	35.0	3.8	375	20
1944	77	15.1	6	37.5	7.8	215	42.3	4	25.0	1.9	216	42.5	6	37.5	2.8	508	16
1945	75	15.8	6	27.3	8.0	160	33.6	8	36.4	5.0	241	50.6	8	36.4	3.3	476	22
Total	7453	15.9	956	37.3	12.8	22207	47.3	1063	41.5	4.8	17321	36.8	544	21.2	3.1	46981	2563
																Fatality Rate 5.5	

care of complications and sequelae. Intubation and tracheotomy are surgical procedures requiring special skill in management of the patient.

EPIDEMIOLOGY

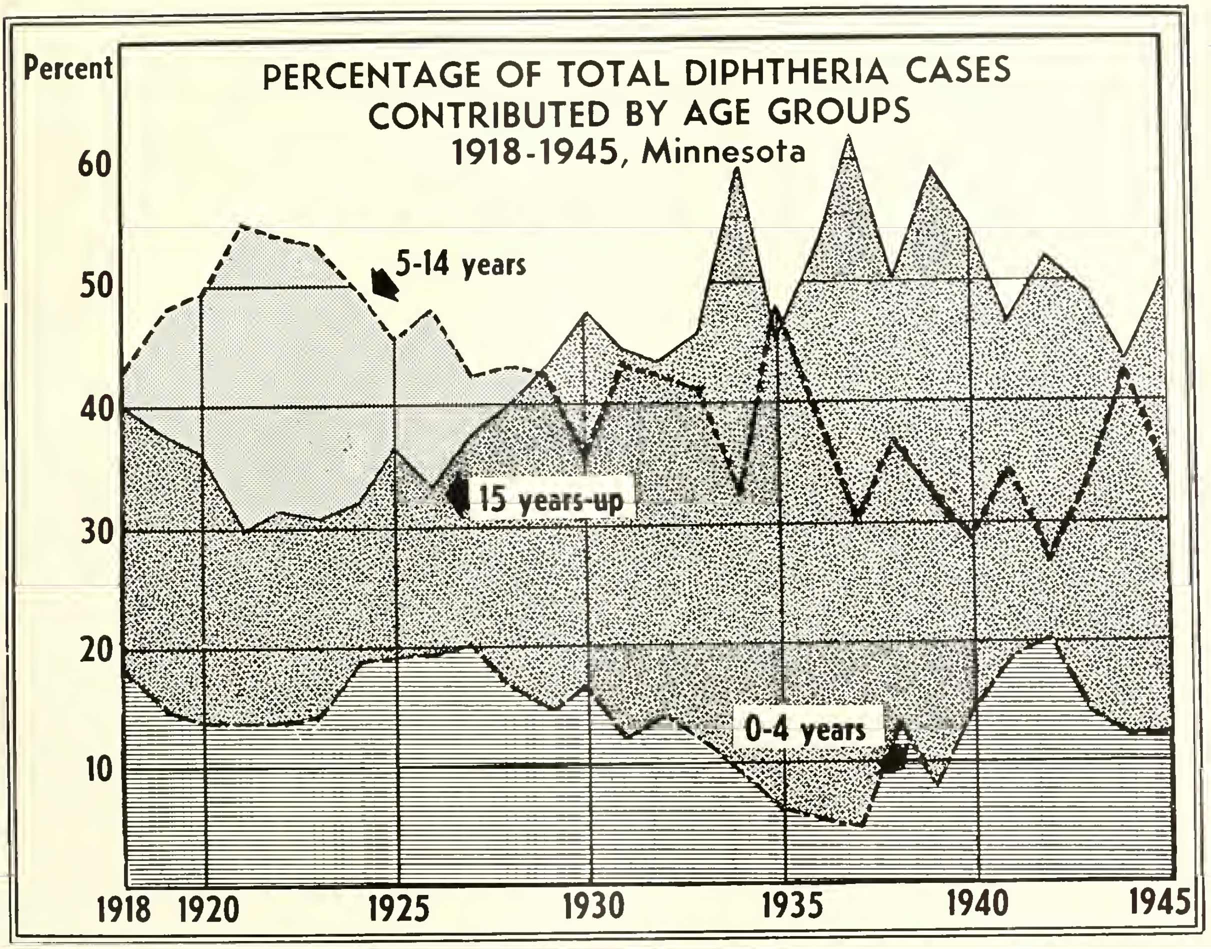
Epidemiologically, diphtheria in Minnesota has changed remarkably over the last half century. Table 1, showing the number of reported cases and deaths for 1910 through 1945, reveals a fifty fold decrease in cases and a ninety-four fold decrease in deaths from the worst year, 1910, to the best year, 1940. Table 1, showing the morbidity rates of reported cases per 100,000 population, and the mortality rates of reported deaths per 100,000 population likewise reveals a fifty-five fold decrease in case rate and 130 fold decrease in death rate for the same period. These figures and rates illustrate the marked changes in the public health of the state as a whole, in respect to diphtheria.

But as regards the individual patient with diphtheria, his chances of surviving have not improved so remarkably. Fatality rates from 1910 through 1945 in Table 1, showing the percentage of reported cases that die of their illness, have ranged from 11.2 per cent of fatalities in 1910, the worst year, to 2.5 per cent in 1934, the best year. Eight years later, however, in 1942, the fatality rate of 8.6 per cent was higher than in any year since 1912. This is also reflected in fatality rates for successive five-year periods as shown in Table 1, showing fatality rates of the periods 1910-14, 1920-24, 1930-34, and 1940-44.

Reported cases and deaths from 1918 through 1945 are shown by broad age groups in Table 2. This table also indicates the relative proportion of all cases and deaths contributed by the various age groups in each year, and the case-fatality percentages for each age group are included. A number of interesting trends appear. The Graph illustrates this.

Both cases and deaths have decreased markedly in all age groups. In general this drop began about 1925 and continued steadily until 1940, when an apparent reversal appeared. Over the years the percentage of all cases contributed by the 0-4 age group has remained practically unchanged although from 1927 to 1937 a steady decrease was apparent. The age group 5-14 years has since 1921 formed a steadily declining proportion of all reported cases. The oldest age group, 15 years and up, has on the other hand shown a steady increase in percentage of all cases, so that after 1929, this age group consistently exceeded the 5-14 year group in proportion of cases.

These same trends are apparent in considering deaths in the different age groups. The 0-4 year group has contributed a widely varying percentage of all deaths but with no consistent trend that has persisted for more than 3 or 4 years. The 5-14 age group has shown a trend of decreasing proportion of all deaths, especially in the years 1925 through 1935, and the oldest age group, 15 years and up, have formed an increasing percentage of all the deaths. Here again, wide variations have appeared in the figures of late years.



For the 28 years experience 1918 through 1945, the age group 0 to 4 years inclusive, contributed 15.9 per cent of all cases and 37.3 per cent of all deaths; the ages 5 through 14 years furnished 47.3 per cent of cases and 41.5 per cent of deaths; and ages 15 years and up formed 36.8 per cent of cases and 21.2 per cent of deaths.

The fatality rates in Table 2 show quite clearly that in Minnesota diphtheria has always been especially dangerous for children under 5 years. The percentage of fatal cases among this age group is two and a half times the fatality rate of age group 5-14 years, and over four times the proportion of fatal cases among the age group 15 years and over.

The distribution of cases and deaths by sex is interesting although not highly significant. In the 28 year period 1918 through 1945, 47 per cent of reported cases have occurred in males, and 52 per cent of reported deaths have been males. The fatality rate of diphtheria in males has been 6.0 per cent. In females, the fatality rate has been 5.0 per cent of all diphtheria occurring in females, and although females contribute a higher percentage, or 53 per cent, of the total cases, they contribute only 48 per cent of the deaths. These proportions have been true consistently throughout this period. Table 3 shows the proportions from January 1 to October 31, 1946.

Since 1940, an alarming increase in both cases and deaths of diphtheria in Minnesota has occurred. The figures are shown in Tables 1, 2, and 3. This increase has

Table 3

Diphtheria Cases and Deaths Reported from January 1 to October 31, 1946

Age	Cases			Deaths		
	Male	Female	Total	Male	Female	Total
Under 1 year	4	4	8			
1 year	7	6	13		1	1
2 years	4	4	8		1	1
3 years	8	5	13	*3	1	4
4 years	4	11	15		2	2
5 to 9 years	44	59	103	2	3	5
10 to 14 years	26	38	64	1	1	2
15 to 19 years	14	28	42			
20 to 24 years	16	34	50	1	1	2
25 to 29 years	20	12	32	1		1
30 to 34 years	8	14	22			
35 to 39 years	12	18	30			
40 to 44 years	7	9	16		2	2
45 to 49 years	6	13	19	2		2
50 to 54 years	6	13	19	2		2
55 to 59 years	5	10	15	2		2
60 to 64 years	5	5	10	1	1	2
65 years and over	9	7	16	2		2
Unknown	21	19	40			
Total	226	309	535	17	13	30

*Includes one death in a Wisconsin resident.

occurred in all age groups and in both sexes. All regions of the state have been affected although several counties have had no cases, and a few locations have had an excessively large number of cases. A study of the 83 fatal cases in this period reveals two significant factors. The first is the immunization status of the fatal cases. Sixty-nine are stated definitely not to have received any immunizing injections; for 13 no information is available, and in only one case was any immunizing procedure reported. This patient had been given two injections of some toxoid prior to illness. The second important factor in these 83 fatal cases is the use of diphtheria antitoxin for treatment. Table 4 shows the day of the disease when antitoxin was first given. Over 33 per cent of the cases received no antitoxin at all, and less than one-fifth of the cases received antitoxin within the first four days of disease.

TABLE 4

DAY OF DISEASE WHEN ANTITOXIN WAS FIRST GIVEN TO 83 FATAL CASES OF DIPHTHERIA IN MINNESOTA, 1940 TO 1945, INCLUSIVE

Day of Disease	No. of Cases	Day of Disease	No. of Cases
1	2	12	1
2	5	13	0
3	3	14	3
4	5	33	1
5	13	Antitoxin given but day not stated	3
6	3		
7	4	No antitoxin given	28
8	3		
9	3	No record	3
10	1		—
11	2	Total	83

RECOMMENDATIONS

Diphtheria has also occurred among immunized persons, as was to be expected. These apparent failures are due to inadequate initial immunization or to prolonged lapse of time between immunization and onset of illness. Experience in Minnesota and elsewhere indicates that diphtheria attacks the non-immunized seven to ten times more frequently than the immunized, and causes severe illness and death almost entirely among the non-immunized. But with increasing immunization of school children and reduction of cases, natural immunity is developed far less frequently than in earlier years among the non-immunized population, mainly pre-school children and adults. It was formerly felt that by immunizing 70 per cent of all school children, or 30 per cent of all pre-school children, diphtheria would automatically disappear. It now appears that our goal should be lifted to secure a minimum of 55 per cent of all pre-school children immunized. The need for a booster dose of diphtheria toxoid on entry into school should be emphasized.

The following schedule of injections, recommended by the American Public Health Association, is strongly urged:

1. Alum precipitated toxoid is preferred to fluid toxoid since it has been clearly shown to be a superior antigenic stimulus. This toxoid is commonly combined with tetanus alum precipitated toxoid. It is urged that initial immunization consists of two injections, 1 ml. each, of precipitated toxoid administered one month apart, the first to be given at six months of age. The Biologic Committee of the Minnesota State Board of Health has recommended that diphtheria-tetanus alum precipitated toxoid be given in three doses rather than two, as suggested by the manufacturers.

2. To all children receiving initial immunization in infancy, a booster dose of 1 ml. alum precipitated toxoid is strongly recommended at the time of entry into school.

3. Children of pre-school and school age who were not immunized as infants should receive the course of injections mentioned in "1" above.

4. In the face of epidemic occurrence of diphtheria in a given community, booster doses of toxoid might well be given to all children who have not been so immunized during the previous three years.

5. The occurrence of diphtheria in a household should lead to the immediate administration of toxoid to other household members including adults. Preliminary Schick testing and testing for sensitivity to toxoid may be indicated for adults. Depending on the results of such tests, a modified course of diphtheria toxoid may be given.

Schick testing should not have mass application, especially in children under 12 years of age; no active immunity results from the test and it frequently is sufficiently painful to make it difficult to get the child to return for necessary injections of toxoid. However, in older children and adults, severe reactions sometimes occur due to sensitivity to toxoid and for these persons Schick testing is more essential. Physicians may well wish to use the Schick test with private patients.

In treating the disease it is strongly urged that diphtheria antitoxin be administered immediately by the physician to all patients in whom he suspects the diagnosis of diphtheria. The practice of awaiting the reports of laboratory examinations of nose and throat cultures before administering specific serum therapy, despite the presence of clinical evidence of diphtheria, is to be strongly discouraged. The use of penicillin or sulfonamide drugs has not prevented death from diphtheria infection.

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The Present Status of Tropical and Exotic Diseases Among Servicemen

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Up to the present, the return of servicemen from parts of the world in which tropical and exotic diseases are endemic has had no apparent serious effect on the public health. Malaria is the most common of these diseases, yet there has been neither a detectable increase in the number of cases of malaria recorded in the civilian population nor evidence to show that the severity of malaria has been increased by the introduction of new strains of plasmodia. Likewise, there has been no significant increase in the incidence of smallpox, typhoid fever, plague and bacillary and amebic dysentery that can be ascribed definitely to military personnel returned from World War II. Further, there is no available evidence of the occurrence of dengue fever, filariasis or schistosomiasis in civilians. This favorable situation confirms the predictions made by experts of the Army, Navy and United States Public Health Service and civilian experts who previously had analyzed the problem [1-6] and had pointed out that the danger of introduction of these diseases was extremely remote because the climatic, economic and social conditions in the United States are widely different from those in areas in which the diseases are endemic. Butler and Sapero [6] aptly stated that there is more to the introduction of a "new" disease "than the mere presence of the disease in overseas areas occupied by American troops and its absence at home."

Although these diseases and their complications are of little public-health concern and importance, they occasionally may be encountered by physicians and surgeons of the Northwest, and when they do occur they may present difficult and complicated diagnostic and therapeutic problems. This is particularly true of those diseases in which the liver may be involved. These include infections with Endamœba histolytica, the virus or causative agent of epidemic hepatitis, the adult worms and ova of Schistosoma japonicum and the larval stages of Echinococcus granulosus. Less difficult to diagnose and treat will be malaria. The nature of these diagnostic and therapeutic problems will be discussed separately.

Amebiasis

Recent surveys of military personnel returned to the United States from overseas have failed to show a higher incidence of infections with Endamœba histolytica than exists in our less-traveled native population. The incidence of amebiasis in this country usually is regarded as being between 10 and 20 per cent. Marion and Sweetsir [7] found Endamœba histolytica in 16.8 per cent of 1,000 Army personnel returned from overseas, and Michael [8] found the parasite in 8.9 per cent of 1,000 Navy men returned to the United States. There are several possible explanations for this low incidence. First, sanitary and hygienic conditions in military installations were far better than usually is realized, and water purification, garbage disposal and measures for insect control compared favorably with those in the most progressive and modern cities in this country. Second, medical and laboratory officers were trained to be alert to detect amebiasis, and this undoubtedly resulted in the prompt and intensive treatment of both proved and many merely suspected infections.

The aforementioned figures probably reflect the true situation, and will not be significantly altered by future surveys. They indicate that amebiasis in this country will not present any essentially new, or greater number of, diagnostic and therapeutic problems than it did before the war. These old problems have been reviewed recently and authoritatively by Snell.[9]

The most common and serious complication of amebiasis is abscess of the liver. Recognition of this condition may be difficult in persons who do not have a recent history of amebiasis, because the formation of hepatic abscess with symptoms may occur as late as twenty years after the primary infection, according to some observers. Pain in the liver and enlargement and tenderness of this organ are the most common early observations. They occur in 75 to 100 per cent of the cases. The pain varies from a dull ache to a severe sharp pain that often extends from the area of the liver to the right shoulder. It may be elicited by sudden twisting, turning or jarring movements. Fever is a common symptom. Less common are weakness, loss of weight, diarrhea, chills, nausea and vomiting, and jaundice. The presence of the common symptoms calls for roentgenologic examinations.[10] The following signs are considered to be pathognomonic of abscess of the liver: "obliteration of the right cardiophrenic angle in the lateral view, elevation and fixation of the right leaf of the diaphragm, pointing of the abscess toward the right lung field and a pneumonitis of the right lung." Abscesses, single or multiple, rarely may occur in the left lobe of the liver. In this location they may be demonstrated roentgenologically by the deformity produced in a barium-filled stomach.[11] Tests of hepatic function will not contribute much toward establishment of a diagnosis of amebic abscess.[12] The result of the cephalin-cholesterol flocculation test is, however, often positive in the presence of amebiasis of the colon.[13]

About 60 per cent of abscesses of the liver detected by the aforementioned procedures are amebic. The distinction between amebic abscess and nonamebic abscess can be made unequivocably only by demonstration of Endamœba histolytica in material from the abscess itself or from its wall. It is often more expedient to make the diagnosis on the basis of the clinical response to emetine hydrochloride, which is dramatic in the presence of amebic abscesses. The dose usually is 1 grain (0.065 gm.) administered daily for eight to twelve days, and repeated at intervals of three weeks or longer, depending on the results obtained. A single course may be sufficient. Symptoms of toxicity should be watched for. The most serious are a decrease in blood pressure and cardiac irregularity. These occur more commonly in debilitated persons. If Endamœba histolytica is found in specimens of stool, the use of carbarsone, iodochlorhydroxyquinoline (vioform) or 5-7-diiodo-8-hydroxyquinoline (diodoquin) is indicated. The administration of carbarsone is started on the third day. A capsule containing 0.25 gm. is administered three times a day for seven days. After an interval of seven days, vioform is given orally. A dose of 0.25 gm. is given three times a day for seven days. Diodoquin may be substituted for vioform, and may be found to be more effective. The dose is three to four tablets (0.2 gm.) administered three times a day for twelve days. Toxicity caused by diodoquin has been reported [14] but is rare. The toxicity results from the absorption of iodine, and manifests itself chiefly by the formation of furuncles. Aspiration of the contents of large abscesses may hasten recovery. Establishment of open drainage should be considered only after medical treatment has failed to produce satisfactory results.

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EPIDEMIC HEPATITIS

Watson and Hoffbauer [15] recently cited evidence that in some cases, epidemic hepatitis may become chronic and that diffuse cirrhosis ultimately may develop. The number of veterans in whom this complication exists must, indeed, be very small, because Lucké [16-18] has pointed out that the great majority of patients who have epidemic hepatitis recover without residual damage to the liver.

The recognition of chronic hepatitis often is difficult. The history of an unusually prolonged attack of epidemic hepatitis, with recurrence of jaundice after apparent recovery, is suggestive. Weakness, easy fatigability, pain and tenderness over the area of the liver frequently are the only complaints. Objective evidence of chronic hepatitis is obtained by evaluation of hepatic function at monthly or bimonthly intervals. Hoagland [19] has suggested that treatment should be similar to that administered in sanatoriums for tuberculosis: strict adherence to rest, regular sleep, avoidance of alcohol, and graded activity. With the patient on such a regimen the hepatitis may become latent and symptoms abate.

When chronic hepatitis progresses to cirrhosis, anorexia, loss of weight, anemia, persistent retention of bromsulfalein, reversal of the albumin-globulin ratio, minimal or marked hyperbilirubinemia and extreme hypoproteinemia accompanied by edema and ascites may be noted. Hoagland pointed out that such chronic hepatic insufficiency has many of the characteristics of a multiple deficiency disease. The deficiency is due in part to a faulty dietary intake, but for the greater part to inability of the damaged liver to carry out its function in the intermediary metabolism of numerous substances essential for the maintenance of bodily economy. Therapy, therefore, must be directed toward the replacement of these substances. A diet containing fat (90 to 120 gm.) as well as protein (125 to 150 gm.) and carbohydrate (sufficient for an adequate caloric intake) is indicated. Fat increases the palatability of food, and has no apparent harmful effect, as formerly was believed. The transfusion of blood and the infusion of plasma and especially albumin may have a favorable effect on edema and ascites. Crude liver extract, sulfur-amino acids and vitamins also may help to meet the deficiency.

SCHISTOSOMIASIS

Dieuaide [20] estimated that cirrhosis ultimately would develop in 4 to 5 per cent of the American soldiers infected with Schistosoma japonicum on Leyte Island in the Philippines. The figure seems high, but even if it is correct, it means that no more than 150 to 200 patients with this hepatic complication will be seen. This is based on a total estimated number of 3,000 infections.

The diagnosis of this complication will depend, in the final analysis, on demonstration of Schistosoma japonicum in specimens of stool or in sections of liver at biopsy. It may be suspected when a person has the symptoms of hepatic insufficiency and a history of acute schistosomiasis while he was in military service.

Treatment will be directed toward the metabolic syndrome, as in cirrhosis which follows epidemic hepatitis, and not toward eradication of the parasite (most of the patients already will have had repeated courses of antimony therapy).

HYDATID DISEASE

The recent appearance of a veteran of World War II at the Mayo Clinic with hydatid disease adds another uncommon disease [21] to the list of those conditions that may be encountered rarely in the Middle West. The patient was referred to the Mayo Clinic from South Dakota because of the presence of "two rapidly growing tumors of the lung." Pneumonectomy was performed and the operative specimen was found to contain two cysts, each of which contained the characteristic larval forms (scolices and hooklets) of Echinococcus granulosus. The patient's history indicated that he had most likely acquired the infection in Italy in 1944. Results of both complement fixation and intradermal tests carried out before and after operation were negative. He was the only patient with echinococcosis yet seen at the Mayo Clinic whose skin was not sensitive to Echinococcus antigen or in whom complement-fixing antibodies could not be demonstrated in samples of serum. The only explanation is that the infection was of relatively short duration, so that insufficient time had elapsed for sensitization to take place. Ordinarily, hydatid disease is not recognized until many years after the ingestion of the infective ova. This is because the cysts, as a rule, grow very slowly and produce neither symptoms nor signs until they reach such a size as to rupture, produce pressure on important structures or obvious bodily distortion (bulging of the thorax or swelling along the costal margin[22]). In such cases a presumptive diagnosis is made on the basis of the results of intradermal and complement fixation tests, and a final diagnosis is achieved by the finding of scolices and hooklets in specimens obtained by aspiration or operation.

SCRUB TYPHUS

At one time during the war there was considerable apprehension as to the possibility of myocardial damage in a considerable number of men who had scrub typhus. Although the complication did occur, its incidence was not high and it is unlikely that such damage could now be demonstrated.

FILARIASIS

The prompt removal of men who had a diagnosis of filariasis from areas in which this disease was endemic is believed to have eliminated all possibility of the commonly pictured sequelae of this infection.

MALARIA

The chances that a physician or surgeon in the Northwest will encounter a tropical disease in his practice is greater in respect to malaria than in respect to any of the others. The reasons are that tertian (vivax) malaria may recur at various intervals up to three years or longer after the primary infection, and that there were a large number of primary infections. Sapero[23] has estimated that all types of malaria probably accounted for a million hospital admissions during the war.

Relapses often are recognized by the patient,[24] and a physician is called for treatment rather than for diagnosis. Under this and all other circumstances suitable blood smears should be made before treatment is begun. Preferably, parasites should be demonstrated beforehand, but this may be impracticable if the smears must be sent by mail to a diagnostic laboratory for examination. Both a thin and a thick smear are necessary. Clear, unscratched, noncorroded slides free of grease, dust, acid or alkali are required. The skin should be cleaned with alcohol and dried before the finger or ear is pricked. The thin smear is made in the manner usually employed in making a differential count. The thick smear is made by placing several average-size drops of blood near each other on a slide; then, with a needle, applicator stick or the corner of a clean slide, these drops are puddled together into a homogeneous drop about the size of a dime. The slide must then be laid flat to dry evenly, and covered to protect it from dust and insects. Slides shipped by mail either should be sent in slide boxes or should be wrapped, when dry, slide over slide, in toilet paper in small packages. Slides should not be mailed in envelopes. Broken slides are difficult to stain and examine. The details of the microscopic diagnosis of malaria have been succinctly described and illustrated by Wilcox;[25] for those interested it is recommended that a copy of her publication be obtained.

Relapses may be effectively treated with one of three drugs: quinine, atabrine or chloroquine. Chloroquine (SN7618) is a new antimalarial drug which apparently has certain advantages over the others. According to Most and associates,[26] chloroquine is a highly effective, safe antimalarial drug which is superior to quinine and quinacrine hydrochloride (atabrine) in the acute attack of tertian malaria for the following reasons: it produces prompter control of fever in delayed primary attacks of infections of Pacific origin and in relapses of infections of Mediterranean or of Pacific origin; it causes more rapid disappearance of parasites from the blood; it ensures more effective control of symptoms (headache, backache, weakness, dizziness, lightheadedness); it assures a longer interval before relapse; and it brings about absence of the disturbing symptoms of cinchonism while it provides ease of administration. Generalized pruritis, particularly on the palms and soles, often accompanies the administration of chloroquine, and may be considered a disadvantage. The recommended dose[27] is 0.6 gm. (two tablets), initially followed in six to eight hours by 0.3 gm., and a single dose of 0.3 gm. on each of two consecutive days. This dose is sufficient to produce prompt disappearance of symptoms and of the parasites from the blood.

The ready availability and the proved effectiveness of atabrine may recommend its selection in the treatment of relapses or delayed primary attacks. Two tablets of atabrine (0.2 gm.) should be administered every six hours, night and day, for five doses, followed by one tablet (0.1 gm.) taken three times a day after meals for six days.[28,29]

The newest antimalarial drug to be described[30] is pentaquine (SN13,276). Combined with quinine, it is said to "cure" some instances of tertian malaria and to prevent further relapses. The curative dose, however, is close to the toxic dose, and its use is not recommended until results of additional studies of its value are reported.

It is predicted that tertian malaria will "burn out" in the course of three years after the primary infection. At first it was believed that relapses would be uncommon after two years. Future events again may change our estimates.

Relapses are believed sometimes to follow overindulgence in alcohol, or fatigue, exposure to cold, debility arising from infectious diseases and surgical operations. Some of these factors are avoidable.

Much has been written about the as yet undemonstrated exo-erythrocytic development cycle of Plasmodium vivax. Such a cycle has been shown to occur when chicks are inoculated with the sporozoites of Plasmodium gallinacium, but until there is more evidence of the existence of such a developmental cycle in man it seems premature to explain relapses on this basis. At present there is no satisfactory answer as to why estivo-autumnal malaria is cured by atabrine but tertian malaria undergoes relapse.

CONCLUSIONS

Tropical and exotic diseases in military personnel returned to the United States neither constitute a hazard to the public health nor are expected to be present in sufficient numbers to cause many serious and difficult diagnostic and therapeutic problems for the physicians in the Northwest.

Credit for this favorable situation is due in considerable part to the often overlooked fact that during the war field sanitation and hygienic practices reached levels unprecedented in military campaigns, and to the fact that our medical officers possessed the ability efficiently to diagnose and treat these diseases in the areas in which they were endemic.

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NEW AIR AMBULANCE SERVICE

The planes of the country's first C.A.A.-licensed air ambulance service inaugurated at the Durham-Raleigh Airport, N. C., on September 21st by Governor Gregg Cherry and Dr. William M. Coppridge, President of the Medical Society of North Carolina, are fully equipped for maximum safety and comfort of the patient, Air Ambulance, Inc., announced November 12. The service provides fast and comfortable air transportation to patients or invalids to any part of the U.S.A.

Using Cessna T-50 twin engine transports, the fleet of planes has been specially re-outfitted as air ambulances. The equipment includes the Hess & Eisenhardt ambulance cot stretcher with foam rubber mattress enclosed in sheet rubber, Emerson Resuscitator and Inhalator, plus attending drugs and equipment.

Beside the pilot who is equipped with full radio and blind flying instruments, there are accommodations for the patient on the cot, doctor or nurse along side the patient and an extra seat for the patient's friend or relative. A registered flight nurse to accompany each patient is part of the service.

Nothing has been left undone that would add to the comfort and safety of the patient. The cabins of the planes are insulated with sound-proofing material and have two cabin heaters, keeping the interior comfortable regardless of cold weather conditions. Automatic fire extinguishers are installed on each engine, reducing the fire hazard to a minimum.

UROLOGY AWARD

The American Urological Association offers an annual award "not to exceed $500" for an essay (or essays) on the result of some clinical or laboratory research in Urology. Competition shall be limited to urologists who have been in such specific practice for not more than five years and to residents in urology in recognized hospitals.

For full particulars write the Secretary, Dr. Thomas D. Moore, 899 Madison Avenue, Memphis, Tennessee. Essays must be in his hands before May 1, 1947.

The selected essay (or essays) will appear on the program of the forthcoming meeting of the American Urological Association, to be held at the Hotel Statler, Buffalo, New York, June 30-July 3, 1947.

Editorials

PUBLIC HEALTH AND THE PRACTICING PHYSICIAN

The expansion of public health services for all the people of the country has been one of the aims of our social security program in this country. Prior to the passage of the Social Security law in 1935 the federal government had given some small assistance to state and local communities for the protection of public health, but in the main public health services were financed and administered locally.

Since 1935 we have seen more and more federal appropriations for public health services of various types. Much of the money appropriated has been allotted to the states for state and community expenditure and planning. This has permitted health departments to provide better services in those fields in which they were already working and to extend public health services to new fields. Whereas some years ago the chief responsibility of a health department was thought to be the control of communicable diseases and this is still one of the major problems of a health department, newer concepts in public health planning include other diseases which cause high morbidity and mortality, even though in some instances the specific etiology is still unknown.

It is well recognized that if communities are to have adequate public health protection, there must be local health units through which these public health services can be given. In the north central area of the United States one of the urgent needs is the establishment of more local health units in order that full-time trained public health personnel may be available to all communities.

However, no matter how much money is appropriated at the federal, state or local level, nor how complete and efficient a public health organization is established, a large share of the public health protection which any community obtains, it receives at the hands of the private practitioner of medicine. The only effective health programs have been developed where the health department and the practicing physicians in the community have worked together in such a preventive program. The immunization against communicable diseases cannot be accomplished by a health department alone, nor by the private practitioner alone. While the practicing physician may actually administer the immunizing agent, the health department must familiarize the people with the necessity for such immunizations and motivate them to seek prevention for themselves and their children. The control of venereal diseases depends upon the diagnosis and treatment of clinical cases by the private physician and the follow-up of contacts by the health department. The health department aids the practicing physician through its laboratory by providing certain diagnostic facilities. The physician aids the health department in the bookkeeping of public health by reporting births and deaths, as well as in many other cooperative undertakings. Thus the two, the practicing physician and the health department, as a team, are responsible for the impressive progress which has been made for the improvement of the health of the people of this country.

R. E. B.

PUBLIC HEALTH AND TUBERCULOSIS

Despite the often repeated statement that tuberculosis is curable and preventable, it continues to lead all diseases as a cause of incapacity and death in the world as a whole. Just before the second world war only Australia, Denmark, the Netherlands and the United States had mortality rates less than 50 per 100,000. Tuberculosis is contagious and, therefore, is of interest to all citizens. Good public health work involves every aspect of the disease from the time tubercle bacilli invade the tissues throughout all subsequent developments.

The objective is to prevent humans and animals from becoming infected with tubercle bacilli. Although this is costly, it is the only known method of controlling or eradicating the disease. To accomplish this end, numerous methods have been employed to prevent tubercle bacilli from entering the bodies of the uninfected. This has been so successfully accomplished by the veterinarians among the cattle of the United States, that the disease has been completely eradicated in large areas and constitutes only a minor problem in the remainder of the nation. It is now an extreme rarity for a human to become infected with the bovine type of tubercle bacillus. As tuberculosis was controlled and eradicated among the cattle herds there was a sharp decline in mortality, morbidity and infection attack rate among humans in the same areas. In countries where the disease has not been controlled among the cattle, approximately one third of all extrathoracic clinical tuberculosis, and from 1 to 6 per cent of pulmonary tuberculosis in man is due to the bovine type of tubercle bacillus.

A problem which now confronts the veterinarian is that of cattle becoming infected from humans. Persons with the bovine type of pulmonary tuberculosis can transmit it to cattle where it may result in serious disease. Those with the human type transmit it to cattle, where it usually produces lesions that do not become clinically significant, but the tissues are sensitized. Frequently when a clean herd is later found to contain tuberculin reactors, the source is found in a person who is in contact with the cattle, such as a farm-hand or the owner himself.

Before arriving at their fine accomplishment of tuberculosis control among animals, veterinarians used various screening processes; however, not much was accomplished until a highly sensitive diagnostic agent was found in the tuberculin test. This locates all infected animals regardless of the minuteness of the lesions.

In human tuberculosis numerous screens have been used to find the persons who have the disease. A considerable percentage of those with advanced disease can be found with a stethoscope and the recovery of tubercle bacilli from the sputum. This is a coarse meshed screen and, therefore, fails to detect the majority of persons who have tuberculosis. X-ray inspection of the chest has been used extensively and while the meshes of this screen are smaller than those of the stethoscopic procedure, they are still far too wide to detect the majority of persons who have tuberculous lesions. Such inspection provides evidence from only macroscopic lesions that are sufficiently dense to absorb X-rays which are located in the 75 per cent of the lungs visualized on the film. Many adults present pulmonary densities representing fibrous and calcific deposits. Deposition of calcium is not a specific phenomenon; its presence does not necessarily indicate tuberculosis. In wide areas of the United States approximately twice as many persons with calcifications in the chest have nontuberculous conditions rather than tuberculosis. Apparently calcific deposits have little if any relationship to present or future clinical disease. For approximately a quarter of a century we have kept under observation a considerable number of persons with calcium deposits in the chest but have seen no convincing evidence that they break down with clinical tuberculosis more frequently than tuberculin reactors without such demonstrable deposits.

The first X-ray screening of the chests of a large number of adults reveals evidence of gross lesions caused by various etiological agents which must be differentiated from one another by other methods. Those that prove to be tuberculous represent the accrument of lesions over a long period of time. Many chronic tuberculous lesions are permanently brought under control by the body's defense mechanism. Yet they may cast X-ray shadows for the remainder of the individual's lives. In other persons the screening may be done while pulmonary lesions are active and even contagious. Immediately following careful X-ray screening of the chest of any given population with the removal of those with gross active lesions, the situation should be good as far as pulmonary clinical tuberculosis is concerned. However, through the meshes of the X-ray screen have passed large numbers of persons with undetected tuberculous lesions in some of whom clinical disease is sure to develop in succeeding months and years.

Best results are obtainable when the tuberculin test is used as the initial screen. This has such fine meshes that practically all persons who have tuberculous lesions, regardless of their minuteness, are detected. All reactors with clear X-ray films of the chest are potential cases of clinical tuberculosis and must be kept under close surveillance. By the tuberculin test, tuberculosis can be diagnosed earlier than by any other method—in fact, within two months (rarely earlier than three or later than seven weeks) after bacilli first invade the tissues. Whatever is subsequently found by other phases of the examination simply represents gross manifestations of the disease. When reactors are periodically examined with sufficient frequency, these gross manifestations can often be found while they are early and usually before they cause illness or the disease is contagious. Prompt and adequate treatment at this time may prevent illness and contagion in most cases.

Thus, by first screening with tuberculin, followed by periodic X-ray inspection of the reactors, making accurate differential diagnoses and treating promptly as indicated, it is possible to control or even eradicate tuberculosis among humans as effectively as has been done among cattle. This has actually been demonstrated in Minnesota, where in a considerable number of schools there is not a single infected child.

J. A. M.

. . . MEET OUR CONTRIBUTORS . . .

Dr. Ruth E. Boynton, guest editor, is Director of the Student Health Service, University of Minnesota, and Vice-President of the Minnesota State Board of Health. She received her B.S. degree from the University of Wisconsin in 1918, her M.D. from the University of Minnesota in 1921, and her M.S. in 1927.

Dr. Haven Emerson is Professor Emeritus of Public Health Practice, Columbia University, New York. He received his A.B. degree from Harvard University in 1896, and his A.M. and M.D. degrees from Columbia University College of Physicians and Surgeans. He has been a visiting professor at the University of Minnesota since 1941.

Dr. J. A. Myers, professor Public Health and Medicine at the University of Minnesota, has recently been appointed to positions in five major health groups concerned with the study and treatment of tuberculosis.

Dr. Gaylord Anderson is Director, School of Public Health, University of Minnesota. He was graduated from the Harvard Medical School, class of 1928, with degrees of M.D. and Dr. P.H. His specialty is Epidemiology.

Dr. Winston H. Tucker is Commissioner of Health, Evanston, Illinois.

Dr. Jonas E. Salk is professor, Virus Laboratory, Department of Epidemiology, School of Public Health, University of Michigan.

Dr. Myron M. Weaver is Assistant Dean, University of Minnesota Medical School. He is a graduate of the University of Chicago Medical School, 1932, with M.S., Ph.D., and M.D. degrees. He is a diplomate of the American Board of Internal Medicine.

Dr. William A. O'Brien is Director, Postgraduate Medical Education, and professor of Public Health, University of Minnesota. He is well-known for his daily radio talks on health education.

Dr. Dean S. Fleming is Chief, Section of Preventable Diseases, Minnesota Department of Health, and Lecturer, School of Public Health, University of Minnesota. He is a graduate of the University of Minnesota, M.B., M.D., and M.P.H. degrees, with graduate work at Harvard University School of Public Health.

Dr. Don R. Mathieson is with the Division of Clinical Laboratories, Mayo Clinic. He specializes in Bacteriology and Immunology. He was graduated from the University of Minnesota, 1936, with B.A., M.B., and M.D. degrees.

Summary of the North Dakota Conference on "Our Hospital and Health Needs"*

Casper Wolhowe,
Director, Child Welfare Division,
North Dakota Public Welfare Board

Widespread interest of the people of North Dakota in "Our Hospital and Health Needs" was indicated by the presence of 360 people from all parts of the state at this meeting. Many diverse views concerning health matters were expressed, yet the field is by no means exhausted, there being insufficient time in one day to get full expression. As Dr. William M. Smith, our State Health Officer, mentioned, there are actually 25 categories of community health needs ranging from sanitation to recreation.

There were expressed during the day, and better during the evening, some of the views that help to clarify issues which concern us in our efforts to develop an adequate public health program for the people of North Dakota. Of signal importance was Governor Aandahl's closing remark that what we want is a continuing committee that will assimilate all views, theories and advice to the end that we will develop in North Dakota the best public health program there is to be had.

The discussion throughout centered on three major problems which it will be well to keep in mind during review of the meeting. These were:

1. Personnel—the great need for physicians, nurses, dietitians, technicians, etc., all of whom must be well trained.
2. Location—the extent to which health services, including hospitals, and treatment centers, may be brought to people in the country in spite of the advantages of centralization for reasons of economy and better facility.
3. Finance—how to obtain adequate funds for construction, equipment, furnishings, maintenance, and operation.

Following opening remarks by Mr. E. J. Haslerud, Chairman of the State Health Planning Committee, on the need for free discussion to stimulate interest and leadership and Governor Aandahl's address of welcome, Mr. Gilbert Stafne led a panel discussion on "Our Health Needs and Ways of Meeting Them." He first defined full-time public health services as an organized effort for promoting better health for all the people whom it serves through six basic health services: (1) Vital statistics; (2) health education; (3) public health nursing; (4) sanitary engineering; (5) maternal and child hygiene; and (6) communicable disease control.

He also explained district health units, which are made up of one or more counties through the establishment of a District Board of Health and operate in cooperation with and under the direction of the State Department of Health.

It was pointed out by Mr. A. Bavone, Sanitary Engineer, District Health Unit, Minot, that in spite of great advances in sanitary engineering, 50 per cent of our 110 city water systems and 75 per cent of rural water supplies do not comply as yet with accepted standards. There are milk ordinances for only 61 per cent of urban people, none for rural people. He emphasized the need for local health services just as we have education and police services, and advocated one sanitarian for each county in order to get services out to the people.

Miss Irene Donovan, Director of Public Health Nursing, emphasized the great need for personnel. She pointed out that although we have greatly increased our number of public health nurses, (the 46 now in the state being twice the number employed in 1937), we have only 19 counties and 8 cities with public health nursing services. There are 21 counties which have appropriated no funds. To alleviate the personnel shortage, she suggested: recruitment, educational stipends, and consideration of using practical nurses to assist public health nurses.

Mrs. Jerome Evanson, Educational Director of the North Dakota Farmers Union, spoke of need in rural areas for physicians, and for hospitals in which they could work. She expressed also a need for public financing of recreational programs, and for coordination in all education, health, and welfare activities to meet the community need.

Mrs. G. E. Fitzgerald of Mandan, also on the panel, told of how local public health planning committees are organized to include all interested local workers, and Captain Miller, of the Salvation Army, told of their plans to meet emergent needs.

Dr. R. H. Breslin spoke of the great need for neuropsychiatric clinics to treat mental illness, and that to make treatment effective such illness should be relieved of the stigma attached. He suggested that at least 3 per cent of all hospital beds should be designated for the mentally ill.

In leading the afternoon panel on "Our Hospital Problems and Ways of Meeting Them," Father Galowitsch told about a bill developed by the State Health Planning Committee to provide for hospital service by the State Health Department. This bill is now in the hands of the legislative interim committee. Dr. A. E. Spear told of provisions in the Hill-Burton Bill to assist rural communities finance hospital construction. He suggested that a community should have a population of at least 10,000 to endeavor to support a hospital. The trade territory and its center would be a governing factor for location, and telephone lines, main roads, etc., would have to be taken into consideration. Also, hospitals would need to be constructed where physicians will locate and use them.

Reverend Martin Eidbo stated that in financing hospital construction there are three requisites: establishing need, ability to finance, and willingness to pay. Mrs.

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*Held in Senate Chamber, Capitol Building, Bismarck, November 19, 1946. — Presented to the State Health Planning Committee at their meeting, November 20, 1946.

John E. Williams emphasized the greater cost of a small institution, and pointed out that 1.5 employees per patient are needed in small institutions. She urged that all hospitals have qualified personnel. Reverend Keller expressed concern over the danger of over-building and emphasized the need for careful planning with real consideration for the economics of constructing and operating a hospital.

A discussion on "The General Practitioner in His Community" led by Dr. W. A. Wright, Chairman, Economics Committee, State Medical Association, Williston, then followed. It was agreed that today the practitioner had a difficult time getting away from his center to see people in the community—a result of lack of personnel.

Dr. Spear pointed out that there are only 335 doctors in North Dakota. There should be one doctor for every 1500 population and we have only one for every 2000 population without equality of distribution. He stated that in order to get doctors and others to remain in this state we should provide for happy social living, good schools, enjoyable amusements, sufficient income, and facilities for good work. He expressed belief that the four year medical course to be instituted at the University of North Dakota will help. Dr. Agnes Stucke reminded the panel that good work can be done even without facilities.

Rising hospital costs were discussed and it was stated they would be much more costly to the patient had not the time of treatment been very much shortened.

Obed Wyum, Chairman, Sargent County Health Planning Committee, expressing the layman's point of view, said we expect our doctor to help us get well and stay well, and our wants are as follows:

1. Free choice in selecting our doctor, who shall have the right to accept or reject us as patients;
2. Benefits of diagnosis and advice to keep us well;
3. Ready access to clinics and hospitals;
4. All health bills paid, whether by a pre-payment plan or a compulsory tax plan;
5. Comprehensive health services—examinations, treatment, surgery, laboratory, hospitalization all included;
6. Best in scientific, up-to-date treatment methods and care.
7. A situation for the doctor that is conducive to good work; and
8. The common good of all people to be the guide.

Mr. Wyum advised we should get adequate health services established in local communities without waiting for people to be agreed on a master plan.

Dr. M. S. Jacobsen, Elgin, advised it would be a wiser plan to expand small hospitals from time to time as needed rather than to erect large new hospitals doomed to become white elephants. Much depends on the cooperation of the public and the medical practitioners. One doctor might fully utilize a ten bed hospital, but four would need to be available for full utilization of a 35 bed hospital. The community must recognize the extent of its need and also consider the availability of physicians before deciding on the hospital capacity.

Dr. Robert Ray, Garrison, pointed out that the country doctor, typically a family counsellor as well as a medic, is disappearing primarily because of lack of sufficient income for maintaining proper equipment and adequate living and because of the wasting of expensive education in rural areas. Dr. L. W. Larson, Bismarck, commented that should the public wish to retain the country doctor they would no doubt do so.

Mr. Wyum posed some very thought-provoking questions before the physicians on the panel, such as: "what is adequate health care?", "how many patients can a doctor care for within a reasonable number of working hours?", and "what is the difference if a person pays in advance for two regular annual examinations or afterwards for irregular examinations?". These could not be answered in the time allotted.

Mrs. Marguerite Ingram, of the State Health Department, replied to numerous inquiries concerning the availability of Federal funds for hospital construction. She stated that as yet appropriations have only been made for survey purposes and that when and if appropriations are made for construction Federal funds may not be obtained for more than one-third of the planned construction costs.

John Page, Director of the Medical Center to be established at the University of North Dakota, told of plans to utilize all treatment facilities in the state for training purposes. It is hoped this development will in a great measure aid in overcoming the physician shortage.

At the evening banquet, Dr. A. C. Bachmeyer, Director of Study, Commission on Hospital Care, and Director of University of Chicago Clinics, defined a hospital as being a place not only for the care of sick people, but also for their rehabilitation and for conservation of health. He considered it encouraging that medical schools are now teaching students to know health before they know disease.

Dr. Bachmeyer stated that "planning is an attempt to clarify reality" and that it has four major phases: (1) Survey of existing facilities; (2) critical outline for evaluation of needs; (3) imaginative development of a plan; and (4) implementation of plan.

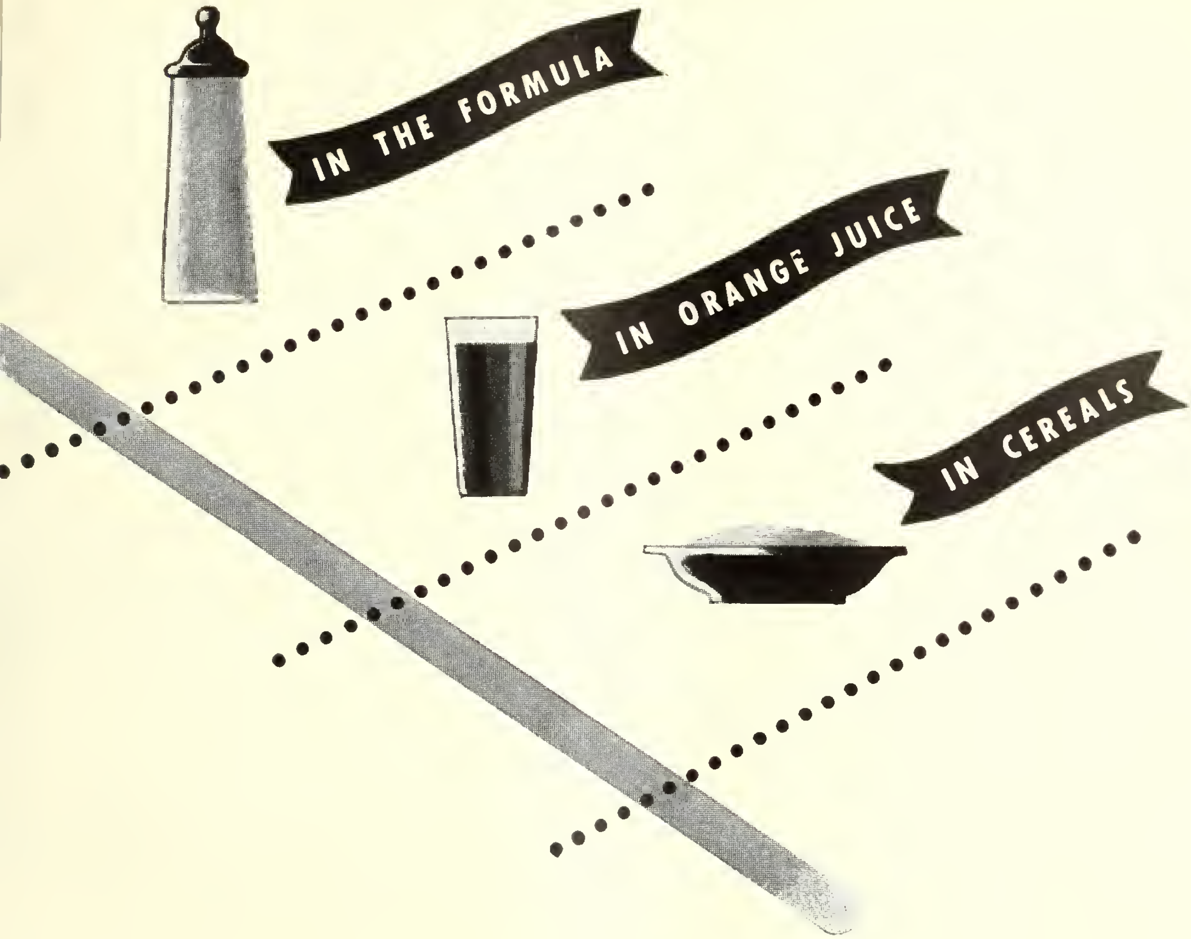
He urged that public and private groups work together and that we all learn to think collectively in community planning.

With bold attention to the matter of location of hospitals, Dr. Bachmeyer stated that, although the average hospital in the United States is of 100 bed capacity, in North Dakota with only 7½ persons to a square mile and an average of only 15,000 people in a radius of 25 miles, we would need smaller hospitals widely distributed. Yet in consideration of factors pertaining to good economy and adequate facility, hospitals less than 50 bed capacity would be disadvantageous. Because only 15 per cent of illnesses are so severe as to require hospitalization, the greater need is to get physicians out to rural areas to treat the other 85 per cent. But to do this, diagnostic and treatment centers should be established in rural areas, especially since doctors are being trained in group practice and develop strong reliance on professional association.

In conclusion, Dr. Bachmeyer set forth the following considerations that would be necessary in determining where to locate hospitals:

1. Population—age, density, and mobility;
2. Socio-economic factors—habits, education, cost of living index, and purchasing power;
3. Transportation—methods rapidly changing, the air age is here;
4. Size of hospital community—large enough to encompass a group that will support, yet small enough to be convenient;
5. Professional personnel available; and
6. Charge to community—it is there whether met by a prepayment plan, by compulsory taxation, or by charge to the patient.

Medical men must assume responsibility for the quality of health services in any given community. They must, therefore, have a situation in which it is ideal to work.



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AMERICAN STUDENT HEALTH ASSN. NEWS

College of William and Mary, Williamsburg, Virginia, is seeking a well qualified resident physician, preferably a woman. Miss Caroline Sinclair is Chairman of the Department of Physical Education for Women. Dr. Pomfret is President of the College.

Miner Teachers College, Washington 1, D. C., has applied for membership in the American Student Health Association.

Roosevelt College, 231 South Wells Street, Chicago 4, Illinois, has applied for membership in the American Student Health Association.

Dr. John Eckel of 1621 Cleveland Avenue, Niagara Falls, New York, has been appointed physician at New York State Teachers College, Cortland, New York.

Dr. Lena M. English, formerly of Kent State University, is now located at Michigan State College, East Lansing, Michigan.

Dr. E. Hurtado, formerly of the University of Illinois Health Service, is now Assistant University Physician at Rutgers University, New Brunswick, New Jersey.

Dr. Frank R. Moore has joined the staff of the Ohio University Health Service, Athens, Ohio.

Robert C. Cornell, M.D., has been appointed Director of Student Health at the University of Maine, Orono, Maine.

Three physicians have been added to the staff of the University Health Service at University of Michigan, Ann Arbor, as reported by Margaret Bell, M.D., Acting Director . They are: Napier S. Aldrich, M.D., Frank G. Ziobrowski, M.D., and John F. Preston, Jr., M.D.

Three physicians have been added to the staff of Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa, Student Health Service. They are: Ralph Hogshead, Jr., M.D., George W. Hogshead, M.D., Phoebe T. Goggin, M.D.

Erma Smith, M.D., has been appointed as Director of Student Health at Woman's College, Duke University, Durham, North Carolina.

Melvin K. Knight, M.D., has recently been appointed on the Student Clinic Service, Cornell University, Ithaca, New York.

Dr. Batchelder of the University of New Hampshire, Durham, New Hampshire, is seeking a woman physician to be assistant director of their Health Service.

John W. Brown, M.D., is now Director of Student Health at the University of Wisconsin, Madison, Wisconsin. His address is 1300 University Avenue, Madison 6, Wisconsin. He has replaced Llewellyn R. Cole, M.D., who is now Coordinatory of Graduate Medical Education at the University of Wisconsin.

NEWS FROM NORTH DAKOTA

The Quain and Ramstad Clinic of Bismarck has added six new doctors to their staff. They are Drs. A. M. Thompson, George S. Boyer, B. C. Corbus, Jr., C. H. Peters, E. J. Laskowski, and Harriet Bixby.

NEWS FROM SOUTH DAKOTA

Dr. N. W. Stewart, Lead, South Dakota, was elected president of the Black Hills Medical Society at the annual meeting on November 7. Other officers are Dr. Bernard Clark, Spearfish, vice-president, and Dr. Arthur A. Lampert, Rapid City, secretary-treasurer. Speakers were Dr. Donald Slaughter, Dr. A. M. Harris, Dr. W. L. Hard, and John C. Foster, executive secretary of the South Dakota Medical Society.

NEWS FROM MONTANA

Up-to-date figures on the chest X-ray program of the tuberculosis control division of the Montana state board of health are announced by Dr. Arthur Rikli, director.

Since June 3, 1946, the mobile X-ray unit has given service to six state institutions, 10 counties and 24 communities taking a total of 19,666 chest X-rays during the period ending October 10 . Of the 19,666 films taken, only 545 were unsatisfactory, 18,568 were essentially negative, 44 definite tuberculosis, 202 suspected tuberculosis and 297, other pathology.

Deaths

Dr. Harold Miller, 53, head of the Student Health Service, South Dakota State College, died November 14 at Brookings, South Dakota.

Dr. Heber G. Morgan, 63, died at Red Lodge, Montana, in November. He had practiced medicine in that section of the state for 30 years.

Dr. E. A. Rumreich, 59, practicing physician at Mahnomen, Minnesota, for the past 33 years, died there November 26.

Dr. Bernard S. Nickerson, 70, Mandan, North Dakota physician who had practiced medicine in the community since 1912, died November 24 at Bismarck. He was a member of the Sixth district Medical society, the A.M.A., and the American College of Surgeons.

Dr. J. H. P. Gauss, 74, former resident of Lewistown, Montana, died at Indianapolis, Indiana, on October 31.

Dr. E. H. Boon, 63, formerly of Tyndall, South Dakota, died at Oak Ridge, Tennessee, October 16.

Dr. R. S. Westaby, 63, for many years a resident of Madison, South Dakota, died November 17 at Flint, Michigan.

Dr. Jesse Macbeth, 66, practicing physician in St. Clair, Minnesota, since 1906, died in Mankato, November 19.

Dr. J. A. Declos, 74, formerly of Henderson, Minnesota, died at his home in Osceola, Wisconsin, November 11.

Dr. Charles S. Harrington, 75, retired Minneapolis physician, died November 18.

Dr. A. M. Lewis, 79, of Austin, Minnesota, died November 5.

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Foreword

Wesley W. Spink, M.D.
Minneapolis, Minnesota

Although the chemotherapeutic agents now being used in medical practice are of relatively recent origin, the concepts of this form of therapy have slowly evolved over the years. It was Paracelsus, who with remarkable courage and foresight, broke away from the Galenic tradition of medicine about four hundred years ago and introduced chemicals into the pharmacopeia. The term, chemotherapy, was coined by Paul Ehrlich at the turn of the present century. A correct interpretation of chemotherapy implies the utilization of any chemical in the treatment of disease. But Ehrlich gave it a more narrow and specific connotation, namely, the sterilization of diseased tissues. In fact, Ehrlich believed that he had achieved his goal, *sterilisans therapia magna,* when he introduced salvarsan.

The greatest advancement that has taken place in the field of chemotherapy to date is represented by the sulfonamides and the antibiotics. Of these, the most remarkable drug is penicillin because of its lethal action on bacterial cells, and its extremely low threshold of toxicity for tissue cells. One of the most unforseen developments in chemotherapy is the fact that para-aminobenzoic acid will protect experimentally infected animals and naturally infected human beings against lethal doses of the rickettsiae. Here, then, is a drug which inhibits the antibacterial action of the sulfonamides, but in certain major diseases it is highly effective therapeutically. Future investigations will be turned to agents effective in diseases due to fungi and viruses. The underlying biological action of the sulfonamides and of the antibiotics is that they interrupt chemical activity necessary for the metabolic functions of bacterial cells, which eventually leads to the failure of reproduction and death of the microorganisms. It is entirely within the realm of possibility that chemicals may be developed which will thwart the reproduction of malignant cells in cancer by a mechanism resembling the action of the sulfonamides on bacterial cells.

Under the impetus of war, millions of dollars were willingly expended in a search for the most destructive weapons for mankind. Out of these efforts came the atomic bomb. Fortunately, atomic energy can also be diverted to alleviate human suffering. Significant advances have already been made with such chemical agents as radioactive phosphorus and radioactive iodine. The radioactive isotope of carbon, C-14, offers an agent for fundamental studies in metabolism. Given wise direction and financial support, further beneficial medical contributions will be forthcoming in the field of atomic energy.

Continued progress should be anticipated in the field of chemotherapy. But such progress is dependent upon basic investigations carried out by competent individuals in well equipped laboratories. Fundamental research cannot and should not be evaluated by the immediate practical application of results. Little did Fleming appreciate the potentialities of his observation in which a mold inhibited the growth of staphylococci on an agar plate. It is becoming more and more apparent that private enterprise cannot continue to support medical research as in the past. Experience during the last war emphasized the value of coordinated research as conducted with governmental aid. Medical research in peace time merits continued and increasing support by appropriations from public funds.

Medical Research Program: American Pharmaceutical Manufacturers' Association Midyear Meeting

THE close relationship that must be maintained between the medical and pharmaceutical professions for true progress in chemotherapy was again demonstrated at the recent midyear meeting of the American Pharmaceutical Manufacturers' Association which was held December 9, 10 and 11 in New York City.

The wide scope of this meeting's notable program effectively scored another point—that scientific research is not isolated from world affairs, but is part and parcel of them, responding to and helping shape the world of today.

During the three tightly-packed days of the meeting, authoritative speakers discussed subjects ranging all the way from specific pharmaceutical manufacturing and medical problems to world economic and social problems.

Research, however, was the dominant theme of the meeting.

APMA president, James L. Rogers opened the meeting with a plea for research in all its phases by the drug industry. Not alone the development of new and better drugs but also research in management, marketing and production is needed, he said, to serve the best interests of the medical profession as well as the drug industry.

Sponsorship of grants by the Association and the creation of a second scientific award, to be given at APMA's annual summer meeting, was recommended in the Research Board's report which was presented by its Chairman, Dr. Theodore G. Klumpp. These recommendations have since been accepted and details are being worked out.

The new award will differ from APMA's present one in that it will go preferably to an individual (or team) for specific achievement rather than for long periods of distinguished service.

The ills attendant on current methods of financing medical research were put squarely before the meeting at this opening session by Dr. Charles F. McKhann, professor of pediatrics at Western Reserve University School of Medicine, and director of pediatrics of the University Hospitals of Cleveland. He posed three possible solutions: (1) Let foundations or industry offer grants to support departments, institutions or teams engaged in continuing research instead of grants which support individual projects. (2) Make medical research self-supporting by letting researchers share the profits resulting from their labor. (3) Gradually transfer medical research from educational institutions to those supported by industry. Dr. McKhann expressed doubts, however, that this latter course would prove feasible.

This year the Citation was given the Mayo Foundation for Medical Education and Research "in recognition of its great contributions to public health, by fundamental research in the field of medical sciences, for the profound and lasting benefit of mankind."

The first part of the ceremony featured the presentation of papers on chemotherapy (most of which are reproduced elsewhere in this issue). Dr. Isaiah Bowman, president of The Johns Hopkins University, gave the Award presentation address. He chose as his subject, "Contributions of Chemistry and Physics to Medicine" and reviewed some of the Mayo Foundation's own outstanding contributions. Dr. Donald C. Balfour, who accepted the Award on behalf of the Foundation, of which he is Director, spoke on "Eras in Medical History."

An atomic energy forum opened the second day of the meeting. It was authoritatively said to be the most comprehensive discussion of the medical and pharmaceutical aspects of atomic energy ever held in this country.

The speakers included Dr. Samuel K. Allison, director of the Institute for Nuclear Studies at the University of Chicago, who spoke on "Atomic Energy in the Physical Sciences;" Dr. Frank H. Krusen, head of the section on physical medicine at The Mayo Clinic and professor of physical medicine at The Mayo Foundation, University of Minnesota, who spoke on "General Medical Aspects of Atomic Energy;" Dr. Shields Warren, pathologist at New England Deaconess Hospital and assistant professor of pathology at Harvard University School of Medicine, who spoke on "Physiological Reactions to Radioactive Isotopes;" Dr. Paul C. Aebersold, chief of the isotopes branch of the research division of Manhattan District, Oak Ridge, who spoke on the "Use of Radioactive Isotopes by the Pharmaceutical Profession;" and Dr. G. Failla, professor of radiology and director of the radiological research laboratory at the College of Physicians and Surgeons, Columbia University, who spoke on "Nuclear Physics and Medical Research." Dr. G. Failla, professor of radiology and director of the radiological research laboratory at the College of Physicians and Surgeons, Columbia University, who spoke on "Nuclear Physics and Medical Research."

While all these scientists acclaimed the potentialities of radioactive isotopes as an aid to medical research and therapy, they also sounded grave warnings. In the Forum's concluding address, Dr. Failla pointed out that if the widespread use of atomic power and radioactive isotopes raised the level of ionizing radiation to which the population is exposed it could influence future generations by causing mutations through a cumulative effect on the germ cells. "We must indeed be wise in the atomic age," he said, "to avoid sudden extermination in an atomic war or slow deterioration and possible extinction of the human race."

Dr. Hans Selye, Director of the Institute of Experimental Medicine and Surgery at the University of Montreal, spoke on "Progress in Endocrinology." He selected as his main topic, "diseases of adaptation," of which the most important, he said, are high blood pressure and stomach ulcers. It would appear from animal experiments, he concluded, that diets consisting predominantly of sugars, rather than meats and salt, would be most effective in preventing the occurrence of the diseases of adaptation in man.

Various committee reports were presented at the industry-business session the following morning (Dec. 11) and at its conclusion the audience heard a scholarly address by Charles Wesley Dunn on "The Postwar World in Which We Now Live."

The meeting ended with a discussion of plans for medical care and the part Federal aid should play in them. All of the speakers agreed with the aims of the Murray-Dingell-Wagner bill but disagreed with its proposed methods of achieving these.

Dr. Robert L. Swain, editor of Drug Trade *News* and chairman of the APMA's committee on economic and social developments, said it was the opinion of the Committee that the defects in medical care should be recognized, and determined efforts made to correct them within the framework of the medical profession, with the government serving in a cooperative and supplementary capacity as the needs may require.

John W. McPherrin, editor of *American Druggist*, reported on a survey of independent druggists with regard to socialized medicine made by that magazine. Out of the total number of replies, only 12.3 per cent were for socialized medicine with 9.3 per cent undecided. However, in Eastern cities with a population over 500,000, 35.7 per cent, or one out of three independent druggists favored the idea, and in the larger cities of the middle west, 23.2 per cent, or nearly one out of four, answered in favor of socialized medicine.

Dr. George Baehr, president of the New York Academy of Medicine, expressed his surprise at the results of the survey. What this country needs, he said, is not an over-all national compulsory scheme but an evolutionary transformation of medical practice. He stated that the New York Academy of Medicine favors not only a revision in medical education, but the gradual extension of group medical practice. Voluntary, nonprofit insurance, he believes, should be given a trial but cannot be expected to solve the entire problem and some government support, preferably in the form of federal or state grants-in-aid, will be required.

Hon. A. L. Miller, member of Congress from Arkansas, whose address concluded the meeting, proposed the creation of Minister of Health as a cabinet post.

CLINICAL USES OF STREPTOMYCIN

Evidence is accumulating as to the effectiveness of streptomycin in the treatment of a limited number of infections and its ineffectiveness in the treatment of many others. Streptomycin has been found to be active in vitro against a variety of gram-negative and gram-positive bacteria. Those most important from the clinical standpoint are listed in the Table.

Organisms Sensitive to Streptomycin in vitro:

Escherichia coli
Eberthella typhosa
Salmonella paratyphi
Salmonella enteridis
Shigella dysenteriae
Proteus vulgaris
Aerobacter aerogenes
Pseudomonas aeruginosa
  (Bacillus pyocyaneus)
Klebsiella pneumoniae
Hemophilus influenzae
Hemophilus pertussis
Staphylococcus aureus
  (some strains)
Mycobacterium tuberculosis
Brucella melitensis
Brucella abortus
Brucella suis
Pasteurella tularensis
Pasteurella pestis

From "Streptomycin," by D. R. Nichols, M.D., and W. E. Herrell, M.D.,
in *J.A.M.A.*, Sept. 28, 1946

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Progress in Antibiotic Therapy

Chester S. Keefer, M.D.*
Bóston, Massachusetts

In 1910 the physicians of the United States made a selection of the ten most important drugs used in medicine in the following order: ether, morphine, digitalis, diphtheria antitoxin, smallpox vaccine, iron, quinine, iodine, alcohol and mercury. In 1945, the editor of the *Journal* of the American Medical Association made a survey of this important subject once again, and while he pointed out that the advancement of therapy in the last 35 years had been so great that it was baffling to any group of experts to select ten of the most useful remedies, one such list was compiled as follows:

1. Penicillin, the sulfonamides and antibiotics
2. Whole blood, blood plasma and blood derivatives
3. Quinacrine and other antimalarial drugs
4. Ether and other anesthetics
5. Digitalis
6. Arsphenamines
7. Immunizing agents, specific sera and vaccines
8. Insulin and liver extract
9. Hormones
10. Vitamins

We all know that progress in antibiotic therapy has been phenomenal in the past five years. The subject of antibiosis or antagonistic relationships between microorganisms and other forms of life is not new, but it is only recently that the practical use of antibiotics in the treatment of human disease has become an accomplished fact. We can say that it is only a beginning and we have every reason to believe that the subject of antibiotic therapy will continue to advance in the future.

An antibiotic agent has been defined in several ways. The term antibiotic is derived from the word antibiosis which means an association between two or more organisms which is detrimental to one of them. One definition might read, "an antibiotic agent is a chemical substance of microbial origin that is capable of inhibiting the growth or the metabolic activity of bacteria." Antibiotic agents have been derived from a variety of microorganisms including yeasts, fungi, molds, algae, and bacteria. Some have also been derived from plants. While most of these antagonistic agents have been studied most extensively for their effect on bacteria, there is good evidence to suggest that some agents exist that have an antagonistic effect on the growth of viruses, fungi, and tumor cells. At the present time we should not be too rigid in our definitions of these agents.

The history of antibiotic agents really began with the fundamental studies of Pasteur in his classical work on the antagonistic effects of bacteria and their products on the anthrax bacillus. The significance of these important observations was appreciated by bacteriologists during the latter part of the 19th century and many studies were made in an attempt to isolate antibiotics. Two such agents were isolated—pyocyanine and prodigiosin. Because of their toxicity and other undesirable properties, neither of these agents was useful as a therapeutic agent. One of the greatest stumbling blocks in the past has been to discover substances which were effective as antibacterial agents and relatively nontoxic for tissue cells. The same difficulty exists today. Another difficulty has been the isolation of these nontoxic antibacterial substances in sufficient quantities for adequate testing.

Renewed interest in this vital subject was aroused by the announcement of Dubos that he had obtained the antibiotic agent tyrothricin from cultures of *Bacillus brevis*. While this agent has only a limited therapeutic use, its discovery served as a powerful stimulus to science and medicine since it brought into focus the wonderful potentialities of antibiotic substances. Intensive research on penicillin and other antibiotics was resumed some years after they had been discovered. The results of this research are well known to all of you. We should not forget that five years ago today (December, 1941) there was not enough penicillin in this country to treat a single patient with any disease. Today the production has reached a staggering figure.

What are the benefits which have flowed from the use of antibiotic agents? They are so numerous that one can only list some of them. In staphylococcic infections of a serious character the fatality rate with bacteremia without penicillin was 80 to 85 per cent. Today it is 25 per cent. The death rate is highest in people who have endocarditis, or some other serious infection such as meningitis. When one considers those staphylococcus infections in certain locations of the body in which death was the rule, such as in cavernous sinus thrombosis or in mediastinitis, and realizes that now 70 to 85 per cent of patients survive, it is remarkable indeed. Staphylococcal abscess in all locations including the brain, the epidural space, the peritoneum, the joints, the pleura, the lungs, the bones, the subcutaneous tissues, all yield in a remarkable manner. The 3800 cases of staphylococcic infection that Dr. Anderson and I have reviewed yield excellent evidence of the striking effects of penicillin in this large and important group of infections.

In hemolytic streptococcal infections which resisted the action of the sulfonamides, the results were equally impressive. Instead of 80 per cent of patients dying as is usual in this group of cases with bacteremia—80 per cent now survive. Patients with pneumonia, meningitis, and endocarditis account for most of the failures—although with infections in these areas, the results are very striking.

In pneumococcic infections, the results are equally impressive. The fatality rate in pneumonia is now less than 5 per cent. Most of the deaths from pneumococcic infection today are due to either meningitis or pneumonia in elderly people, often with complicating diseases.

Presented at the Midyear Meeting of the American Pharmaceutical Manufacturers' Association, New York City, December 9, 1946.

*Wade Professor of Medicine, School of Medicine, Boston University.

In non-hemolytic streptococcal infections exclusive of bacterial endocarditis and in anaerobic streptococcal infections, the end results have been striking indeed with recovery rates in the neighborhood of 70 and 60 per cent respectively.

The results in gonorrhea and syphilis continue to be outstanding, and there is no reason to believe that these diseases cannot be controlled by penicillin alone if treatment is started early in the course of the disease.

In the treatment of bacterial endocarditis the results continue to improve. In the cases due to the non-hemolyic streptococcus, the rate of recovery continues in the neighborhood of 60 to 70 per cent. When the infection is due to the staphylococcus it is only 15 per cent, with the pneumococcus 25 per cent and with the hemolytic streptococcus 50 per cent.

Patients with pyogenic meningitis now survive in greater numbers than ever before. In pneumococcic meningitis 60 per cent live; in staphylococcic meningitis 70 per cent survive, and in non-hemolytic streptococcic meningitis and in hemolytic streptococcic meningitis, the survival rate is 66 to 70 per cent.

Other diseases which are less common have not attracted so much attention, but it is well to say something about them. At least 50 per cent of patients with infections associated with agranulocytosis now recover with penicillin, and 80 per cent of patients with actinomycosis are either greatly improved or recover following its use. All patients with anthrax recover promptly. Seventy-five per cent of patients with gas gangrene recover, and 90 per cent of patients with rat bite fever. Eighty-five per cent of patients with mediastinitis now survive, when usually 98 per cent died. Seventy per cent of patients with cavernous sinus thrombosis survive. And so it goes.

As a prophylactic agent in wounds and burns and in thoracic surgery, penicillin has proved its value. The prevention of bacteremia following tooth extraction is another valuable use for penicillin, as is the treatment of fusospirochetal disease of the mouth and lungs.

When one sums up all the things that penicillin has accomplished, it is no wonder that it has been called the most remarkable chemotherapeutic agent of all time.

But this is not all—what about streptomycin? In this antibiotic, we have the most effective agent against all types of tularemia. The death rate is reduced and the total duration of the disease is shortened. In gram negative bacillary infections with bacteremia, the fatality rate is reduced from 60 per cent to 10 per cent. In influenza bacillus meningitis the fatality rate is reduced from 98 per cent to 30 per cent, and it is extremely effective against sulfonamide-resistant, streptomycin-sensitive organisms infecting the urinary tract. We know that it has a powerful effect on the tubercle bacillus, but the results in human tuberculosis cannot be accurately assessed at present.

Here, then, are a few of the diseases that are controlled in an extraordinary fashion by antibiotic agents. When we realize that we did not have these agents for practical use until four years ago, it is no wonder that we continue to be surprised at the results that are seen every day. This is real progress in an extremely important field.

What of the future? Research in the field of antibiotics is filled with unlimited possibilities. The use of both penicillin and streptomycin is limited because of their ineffectveness against a wide variety of important infections. We need other agents that will be active against organisms and infections which are resistant to penicillin and streptomycin. We need agents that will be destructive to tumor cells and leave normal tissue cells intact. We need agents that will be effective against virus infections. New antibiotics may come from many sources, and I need scarcely tell you that many substances are being investigated. It would be surprising indeed if penicillin and streptomycin were the best that could be developed. Progress can come only from continued research and hard work.

PROTEIN IN BODY GROWTH AND RECOVERY

The use of pure human albumin, a war product, to relieve cases of starvation due to inability to eat after surgery, disease and burns was reported recently at a medical symposium held as a part of the University of Buffalo Centennial celebration, New York.

Two physicians made similar reports about this discovery, Robert Elman, M.D., associate professor of clinical surgery at the Washington University School of Medicine, St. Louis, and F. H. L. Taylor, M.D., Thorndike Memorial Laboratory of the Boston City Hospital.

The albumin is part of the human blood plasma developed at Harvard University during the war. The Navy wanted the albumin for transfusion because it required less space for storage than plasma.

Dr. Elman told of cases in which the male sex hormone, testosterone, given to severely undernourished people, helped to restore appetites.—*Victor News,* December, 1946.

Progress in Allergy Therapy

Samuel M. Feinberg, M.D.*
Chicago, Illinois

The field of allergy is an expansile one. At first concerning itself primarily with hay fever and asthma, it has developed to embrace urticaria, serum and drug reactions, atopic eczema, contact dermatitis, headaches, many gastrointestinal manifestations and the phenomena of some infectious diseases. With proper and intensive investigative approach it promises to unfold as an important factor in many more of the infectious and degenerative diseases. Progress in the therapy of allergy may be discussed along several broad lines.

PRINCIPLE OF SENSITIZATION

The principle of sensitivity to a specific substance such as pollen, foods or animal hair, resulting in symptoms of asthma and rhinitis had been described and proven by such pioneers as Blackley, Salter, Floyer and others a hundred and two hundred years ago. But for the most part the teachings of these early prophets went unheeded. It was not until the turn of this century, when the phenomena of induced sensitiveness in animals—anaphylaxis—was being rapidly elaborated that a foundation was laid for a rebirth of interest in related human disease. It was just 40 years ago—in 1906—that Wolff-Eisner [1] called attention to the similarity of human hay fever to the symptoms of sneezing and rubbing of the nose observed in the guinea pig receiving an anaphylactic dose of an antigen. It was in large part due to this similarity of symptoms and on the close resemblance of asthma to the symptoms of bronchospasm in the anaphylactic guinea pig that interest was focused on the importance of applying the knowledge and future developments of anaphylaxis to human manifestations of hypersensitivity.

DESENSITIZATION

Early in the development of the knowledge of anaphylaxis it was shown that the sensitized animal could be made immune or refractory to shock by the injection of a sublethal dose of the specific agent or antigen. This process was termed antianaphylaxis or desensitization. Around 1910 or 1911 the concept of desensitization began to be applied in human allergy in the treatment of hay fever with pollen extract.[2] Later, this procedure was utilized in sensitivity to other antigens, such as animal danders, house dust and fungi. In principle, desensitization in allergy is akin to desensitization in anaphylaxis, but quantitatively the two differ materially. Too frequently the physician gets the impression that as in anaphylactic sensitivity one or two injections given to the allergic patient will desensitize fairly completely and for an extended period. The fact is that desensitization in allergy is a slow tedious process, requiring numerous injections, achieving moderate although usually clinically adequate tolerance, and demonstrating a great tendency for rapid loss of tolerance when injections are discontinued.

Nevertheless, improvements in this process have been developed, by more careful attention to conditions promoting potency and stability of the extracts and by adopting methods of standardization. There is still considerable room for pioneering in improvements in desensitization. We have an apparently correct principle, requiring improved technique and ideas for its perfection. For example, we need antigens that are relatively free from constitutional reactions, requiring a greatly reduced number of injections and at the same time capable of stimulating a greater production of antibodies. We need to devote more time and energy to the study of the mechanism of allergy and desensitization in order to jockey ourselves into the position of possible new approaches.

ANTIGENS

Progress has been made in the increasing range of source of allergens. First, the role of pollen was established,[3] to be followed by the recognition of the importance of foods, animal epithelium, air-borne fungus spores [4] and a number of other inhalant substances. The role of contact allergens was placed on a sound basis as occupational and other hazards. The growing list of new drugs and pharmaceutical products has increased the problem of allergy in that field and has sharpened the interest of the manufacturer and physician. To mention but a few, we have the problem of allergy to such therapeutic products as serums, aspirin, analgesics, local anesthetics, hormones, vitamins, metallic salts, sulfonamides, penicillin and other antibiotics, vaccines and the media (such as egg) on which viruses are grown. We have the additional problem of allergy in the worker to many products in the pharmaceutical industry.

The concept of the nature of antigens has undergone evolution. At first thought to be only proteins, later the role of carbohydrates as antigens and as haptens was elaborated. An application of this principle was the despeciation of serum globulin by removing the carbohydrate fraction from it by the aid of an enzyme. The work of Landsteiner [5] and his followers demonstrated that simple chemical substances, although not antigenic in themselves, could be combined with larger molecules, such as proteins, to make them perfect and specific antigens. Thus the concept offered an explanation for the phenomenon of allergy to drugs on the basis that such drugs become conjugated to blood or tissue proteins thus becoming true antigens. Exceptions to the above principle have appeared from time to time. For example, we have been able to demonstrate that some simple chemicals (sulfonechloramides) [6] not only can produce atopic manifestations such as asthma and rhinitis, but also

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whealing skin reactions and transferable antibodies in man and probably precipitins in the rabbit.

If such simple chemicals, with or without skin reactivity, can produce atopic manifestations, is it too much to imagine that other simple chemicals present in the air from combustion products of coal or from waste products of manufacturing industries may be the source of a large group of unidentified and predominately urban allergy? And perhaps this concept of allergy to simple chemical substances may extend to foods and other possible sources. It is evident that much room for experimentation and progress exists here.

Antibodies

The demonstration in 1921 by Prausnitz and Küstner [7] of a passively transferable antibody, the reagin, in human allergy paved the way for a clearer understanding of the mechanism of allergy and for much immunological progress. The allergic (atopic) reaction is due to a union of this antibody with the specific antigen. But since this antibody is not diminished by desensitization the puzzle of the mechanism of the latter still remained. When Cooke and his associates,[8] in 1935, demonstrated that in the process of desensitization a new antibody—variously called the blocking, protective or thermostabile antibody—was produced, the principle of immunity through desensitization could be visualized. This antibody blocks the reaction between antigen and reagin. The full role of this immune substance has not yet been established, but it promises to furnish the basis for determination of immunity, it may possibly be produced commercially for passive immunity and it may perhaps be used as a means of aiding the administration of antigens more effectively.

Nonspecific Desensitization

From the very beginning of the demonstration of specific desensitization in anaphylaxis and allergy many workers began to turn their attention to the possibility of finding a method which would desensitize or inhibit anaphylaxis or allergy without the use of a specific antigen. By 1932 at least 165 such methods or substances had been reported:[9] among these were atropine, ether, chloral hydrate, barium salts, heparin, infection with tubercle bacilli and reduction in barometric pressure. Later some of the additional agents proposed were veronal, avertin, potassium salts, vitamins D, C, and P, hormones, nitrohydrochloric acid and such newspaper headliners as anthallan and ethylene disulfonate. The best that can be said of most of these methods is that although an occasional one possessed a certain degree of merit, for the most part they were either impractical, too hazardous or insufficiently effective.

There are, however, possibilities along the direction of nonspecific agents. For example, X-ray therapy to the chest has been helpful in many chronic cases of asthma. Frequently phenomenal relief from allergy occurs during pregnancy. The remarkable effect of intercurrent infectious disease on the allergic state is an observation familiar to all practicing physicians. An infection accompanied by fever may cause more complete relief of a chronic asthma than painstaking specific treatment. Unfortunately the effect usually is only temporary. Fever therapy by physical agents enabled us to duplicate these results to some degree, but by no means were they comparable to the effect of the actual infection. It seems to me that here is an open invitation for intensive research to isolate and to reproduce the substance or mechanism responsible.

Drugs

The discovery of epinephrine and its sympathomimetic action heralded a new era of progress in the symptomatic therapy of allergic manifestations. The isolation of the alkaloid ephedrine and the demonstration of its action when taken orally further advanced this type of therapy. This was followed by the development of a number of related drugs among which may be mentioned racephedrine, benzylphedrine, propadrine, paredrine, neosynephrin, tuamine, privine and others. Whether for topical or systemic effect, the perfect sympathomimetic drug has not yet been made. To produce a drug which will be powerful but selective, yet free from side reactions or compensatory vasodilatation, and to be lasting in its effect is a dream of the chemist and pharmacologist.

Aminophylline is an example of a type of drug owing its antiallergic action to the relaxation of smooth muscle. Other drugs possessing related actions have been presented by pharmaceutical industries, but better antispasmodics are still possible. The iodides are effective in asthma, presumably by stimulating the mucous glands of the bronchi to secrete a thin-non-obstructing secretion. Frequently, however, iodides become objectionable because they produce gastric irritation, acneiform eruptions, swelling of salivary glands and other untoward reactions. It seems to me that it would not be impossible for modern chemists and pharmacologists to find a drug having the desired effect on the mucous glands without the objections of the iodides.

Histamine and Antihistaminic Agents

Following the suggestion by Dale and Laidlaw in 1911 that the symptoms of histamine shock resembled those in anaphylaxis many experimenters added findings tending to substantiate the concept that release of histamine from the tissues is responsible for the anaphylactic reaction. It is true that some of the manifestations of anaphylaxis cannot be explained by histamine effect, but it was argued that histamine is at least the major mechanism. The histamine concept was gradually adopted to explain the allergic reaction in man after Lewis,[11] in 1924, claimed that the histamine effects in man were identical with those of allergy. Many attempts were then made in animals and man to raise the tolerance to histamine by injections of the latter. The preponderance of evidence indicates that a tolerance to histamine cannot be acquired in that manner. The concept of obtaining such tolerance by the administration of conjugated histamine (histamine-azo-protein or hapamine) has not been satisfactorily established. When Best,[12] in 1929, described the behavior of the enzyme histaminase, hope for an effective antihistaminic substance was entertained. Despite a few enthusiastic reports it has been amply proven that histaminase has no effect on histamine in the living animal.[13]

In the last few years a rather intensive search has been going on for an ideal antihistaminic substance. The search has been directed mainly to the type of chemical which is structurally constituted to displace histamine from the cell. The amino acids histidine, cysteine and arginine, first proposed in 1937,[14] were actually such agents, but were entirely too weak in their antihistaminic action and too toxic. In France, Fourneau and his collaborators more than 15 years ago began to synthesize new compounds which displayed antihistaminic and anti-anaphylactic activity. Their first compounds, however, were too toxic for clinical use.

The more recent histamine antagonists are chemically related and have some degree of clinical value. They are the French compounds: N'phenyl-N'benzyl-N-dimethylethylenediamine (Antergan),[15] and N-p-methoxybenzyl-N-dimethylaminoethyl a aminopyridine (Neoantergan),[16] and the American compounds: B-dimethylaminoethyl benzohydryl ether (Benadryl),[17] and Pyridil-N'benzyl-N-dimethylethylenediamine (Pyribenzamine).[18]

In Europe, Antergan has been replaced by Neoantergan. In an extensive clinical trial with Benadryl and Pyribenzamine and a more limited trial with Neoantergan, we have found these drugs useful symptomatic remedies in allergy.[19,4] They give relief to a large percentage of cases of urticaria, atopic eczema, penicillin and sulfonamide reactions, many cases of hay fever and nonseasonal allergic rhinitis and are of aid in the treatment and prevention of constitutional allergic reactions. In asthma the action of all of these drugs is only slight and does not compare favorably with that of ephedrine or epinephrine. Particularly in allergic rhinitis, Pyribenzamine was the most consistently effective of these three drugs. It is important to remember that all of these drugs are only simple palliative remedies, each dose being effective for only a few hours, that in severe allergic states and in many allergic conditions these drugs may not give even symptomatic relief, and that with these drugs no tolerance or immunity to allergy is acquired. Specific allergic methods of elimination or desensitization are still essential procedures in allergy.

The antihistaminic drugs have many side reactions. Benadryl is very prone to produce sleepiness, not infrequently so marked that the patient cannot continue the use of the drug. Pyribenzamine possesses a similar action but to a much lesser degree and in a smaller percentage of patients. All these drugs may produce varying degrees of other side reactions, such as gastrointestinal disturbances, dizziness, nervousness, fall in blood pressure, palpitation, mental confusion and excitation.

These drugs have varying degrees of antihistaminic action in animals. Thus, we found that when the different drugs were given to guinea pigs intraperitoneally in the same dose (3 mg. per kilogram) the following number of lethal doses of histamine were required to produce death in all animals: Benadryl, 5; Antergan, 6; Pyribenzamine, 37, and Neoantergan, 125 lethal doses. On the other hand, when one lethal dose (LD100) was used with diminishing doses of protective agents, the findings indicated that at these levels no significant differences in the antihistaminic powers of these drugs existed. Anaphylactic death was prevented by small doses of these drugs, and no striking differences between them were noted by decreasing the completely effective concentrations. Studies on histamine and anaphylactic contraction of the guinea-pig intestinal strip indicated a greater discrepancy. For example, a drug showing seven times the antihistaminic activity of a second drug as measured on the strip showed no greater inhibition of the anaphylactic contraction. We might add also that the anti-allergic activity of these drugs did not parallel their antihistaminic behavior.

There is still room for the manufacturer to develop antihistaminic drugs with more consistent action and less toxic side effects. I know that many pharmaceutical houses are vigorously pursuing this plan, for I have been privileged to be designated by several of them as an impartial investigator of their product. But in addition to this, another question should be raised: May not some of the discrepancies between antihistaminic, antianaphylactic and antiallergic potency of these drugs constitute an argument against the generally accepted concept that histamine release is the major explanation of the hypersensitive reaction? The least that can be said is that this relationship must be more thoroughly re-examined and that the question of other possible mechanisms of anaphylaxis and allergy must be reopened. In this connection it is my advice to investigators in pharmaceutical industries not to depend solely on antihistaminic action in their quest for effective remedies for allergy. Other screening processes must be invoked.

ROLE OF PHARMACEUTICAL INDUSTRIES

Five to ten million people in this country have recognizable allergic ailments. The field of allergy will ultimately extend to a much greater number when we know more about the allergic processes in infectious and other diseases. What should be the role of the pharmaceutical industries toward helping these millions? It appears to me that industry can have two interests: one, a practical interest in the development of a useful drug or product and two, an interest in fundamental basic research which may ultimately lead to even broader applications. Among the possible interests of pharmaceutical institutions may be included a study and improvement of antigens, search for new antigens, study of antibodies and their possible therapeutic use, search for a non-specific mechanism or substance, development of new sympathomimetic and other drugs, improvements in antihistaminic substances and a search for drugs which interfere with other steps in the allergic reaction. More basic but less immediately rewarding would be the intensive work along the line of allergy to infection and a serious study of the underlying mechanism of the allergic state or constitution. Much of this work can be done within the confines of the industrial institution and much can be done at properly equipped research centers of universities. Some of the work demands the pooled research efforts of a number of pharmaceutical industries. An example of this is the research required to produce a uniform standard for pollen and other antigens, the lack of which is creating confusion and retarding progress. The Committee on Therapy of the American Academy of Allergy is ready and anxious to cooperate in such and similar understakings.

Wherever the research is to be done I am sure you will agree that it requires the team work of the pharmaceutical investigator and the experienced observant and research minded clinician to achieve the best results.[20]

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TABLE OF THE HISTORICAL DEVELOPMENT OF CHEMOTHERAPY IN THE TREATMENT OF TUBERCULOSIS DURING THE PAST 100 YEARS

1850–1880

Pre-chemotherapeutic period — the background
(a few traditional specifics of value in infective diseases—e.g., cinchona for malaria, mercury for syphilis)

1880–1910

Tentative period of chemotherapy (1890–1900)
Period of first successes with synthetic substances (trypan red, salvarsan, etc.) in protozoal and spirochetal infections (1900–10)
Tubercle bacillus discovered (1882)
Tuberculin discovered (1890)
Unsuccessful chemotherapeutic experimentation in tuberculosis

1910–1935

First success with synthetic substance (optochin) in systemic experimental bacterial (pneumococcal infection (1911)
Chemotherapeutic tests with synthetic and natural substances in experimental tuberculosis negative or inconclusive
Gold therapy in clinical tuberculosis flourished (1925-35)

1935–1946

First success with synthetic drug (sulphanilamide) in systemic bacterial (streptococcal) infection in man (1935)
Sulphonamides in experimental tuberculosis (1938–46)
Sulphone compounds in experimental and clinical tuberculosis (1939–46)
Gold therapy for tuberculosis in decline
First successes with antibiotic substance (penicillin) in systemic bacterial infection in man (1940–41)
Streptomycin in experimental and clinical tuberculosis (1945–46)

From "Chemotherapy of Tuberculosis," by P. D'Arcy Hart,
in *British Medical Journal,* November 30, 1946

Progress in Fungous Disease Therapy

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As early as 1677, fungi were discovered as causing the yellow spots on roses. In 1839, Langenbeck demonstrated the organism causing thrush (Oidium albicans), and Schoenlein, the organism causing favus (Acherion schoenleini). Descriptions of the fungi causing tinea circinata and tinea versicolor followed in 1842 and 1846. In 1870, Tilbury Fox described tinea pedis.[1]

Interest in the fungous diseases of man declined from that time until early in this century, when Sabouraud, Castellani, Jadassohn, and Bloch in Europe, and Williams, Weidman, Hopkins, Sulzberger, Peck, and Lewis in America, among others, revived interest in the subject.

Treatment of the superficial fungous infections, even as early as 1880, consisted of topical applications of the then known parasiticides and the internal administration of tonics. Duhring, in 1883,[2] used mercurials, creosote, sulfur, phenol, and iodine to kill the fungi. He recognized acute and chronic, as well as resistant, types of fungous diseases, and stated that the extent, site, and degree of the inflammatory reaction should govern the therapy to be used.

In estimating the progress made in fungous disease therapy, I shall review the literature, beginning with the treatment used 30 years ago as described by the authors of standard texts, but I shall consider only the treatment of tinea pedis and tinea capitis.

TINEA PEDIS

Schamberg, in 1917,[3] used ointments and lotions. The types selected depended on the clinical signs. He advocated careful cleansing of the affected parts, manual removal of dead skin, and wet dressings to allay inflammation. As fungicides, he used dilute tincture of iodine, betanaphthol, resorcin, tar, ammoniated mercury, and chrysarobin. As keratolytics he used Whitfield's ointment and Drew's ointment.

Sutton, in 1927,[4] stated that Strickler, Engman, and McGarry had used fungous vaccine therapy (trichophytin) with success. Sutton said that Whitfield's ointment was thought to be a specific for tinea pedis, "but now we know that such is not the case." To remove dead skin, he mentioned mechanical debridement. He stated that the plan of the treatment must be individualized. In acutely inflammatory cases, soothing remedies such as "lead and opium or Burow's solution may be tried." He warned against the use of irritating remedies. In addition to topical applications indicated by Schamberg in 1917, Sutton mentioned the use of mercurochrome, methylene blue, picric acid, and potassium permanganate.

Investigations of the fungicidal properties of various chemicals were carried on in the period 1930-1938. Woodward, *et al*,[5] found that the introduction of halogen atoms into dihydric phenols increased their fungicidal powers. They also found that the fungicidal powers of iodine, hexyl resorcinol, and chlorothymol were greatly reduced in the presence of serum, and that benzoic acid, salicylic acid, and sodium thiosulfate were entirely ineffective in protein suspensions.

In 1938, Peck and Rosenfeld[6] called attention to the fungicidal powers of the fatty acids and their normal salts contained in sweat. They stated that the normal salts, as a rule, were less effective than the acids, with the exception of sodium propionate and sodium undecylenate, and that the acids with an odd number of carbon atoms were more fungicidal than those with an even number. They stated that valeric acid with 5 carbon atoms was the most powerful, but that pelargonic acid with 9 carbon atoms was almost as strong a fungicide. In 1939, Peck, et al.,[7] stated that the fungicidal properties of sweat were due to its content of acetic, propionic, caproic, caprilic, lactic, and ascorbic acids. These publications were the bases for the present interest in therapy with the salts of fatty acids.

In 1939, Lewis and Hopper[1] published "An Introduction to Medical Mycology." In this book they divide the treatment of tinea pedis into two classes: Topical applications and desensitization. In the acute inflammatory stage of the disease they advocate wet dressings of Burow's solution, (1–15) boric acid, potassium permanganate 1:3000, tannic acid 2 per cent, aqueous solution of gentian violet 1 per cent, and aqueous solution of malachite green 1 per cent. They recommend the incision of large vesicles and blebs. They state that keratolytics are useful in peeling the stratum corneum, which contains the fungi, and also in preparing the way for fungicides to act. Salicylic acid and resorcinol are named as keratolytics. They list a number of fungicides, but no new ones. In their opinion, desensitization with trichophytin and the implantation of *B. subtilis,* strains of *Penicillium* and *Aspergillus* have not met with success.

They state that the patient should be treated as an individual. The drug used should depend on personal requirements, such as the type of fungus, the degree of sensitization, and the clinical symptoms. They believe that the cure of chronic dermatophytosis is rarely achieved and that recurrences are more common than reinfections.

At the beginning of World War II, the finding of a large percentage of soldiers and industrial workers affected with tinea pedis caused a revival of research into the treatment and prevention of this troublesome disease. Many new fungicidal remedies and new methods of prevention were advocated.

J. Gardner Hopkins was appointed to study fungous infections in the Army. The U. S. Public Health Service made studies of dermatophytosis among industrial workers.[7a]

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In 1943, Peck and Schwartz gave formulae for the treatment of superficial fungous infections. Some of these are sodium propionate, sodium pentachlorphenate, and oxyquinoline sulfate.

Keeney and his associates[8,9,10,11] reported in 1943 that sodium propionate, although not fungicidal, appeared to be effective in the treatment of tinea pedis, tinea cruris, tinea capitis, thrush, otomycosis, and black tongue. In 1944, he stated that sodium caprylate, sodium caprate, and sodium undecylenate were more fungistatic than the propionates, valerates, and caproates. As the fatty acid chain lengthened, he said, fungicidal properties increased. Later in 1944, before the National Research Council, Keeney recommended the use of sodium caprate as a treatment for tinea pedis rather than sodium propionate or undecylenate.

At the same meeting, J. Gardner Hopkins[12] stated that dinitrocyclohexyl phenol 10 per cent was the best of the remedies he had tried. This was because it immediately stopped itching. He said that orthocyclohexylpera chlorphenol 1:50,000, proposed by E. G. Klarmann, also was good. In testing a number of powders Dr. Hopkins found that those containing fungicidal agents were only slightly more efficacious than ordinary talcum.

In 1944, Dr. Hopkins reported to the National Research Council that although he recommended undecylenic acid for dermatophytosis of the feet, he did not consider it an ideal preparation. But it is more effective than most available preparations, he said, and is safe for men to use on their own initiative.

Peck, et al.,[7a] on examining 2,123 workers, found about 45 per cent infected with tinea pedis. They also found that shower room flooring is not a likely source of infection; that no reduction in the incidence of tinea pedis was shown by fungicidal foot baths after showers; and that dermatophytosis and its allergic manifestations were not an important cause of lost time among industrial workers.

Goldman, et al.,[13] stated that fungous diseases of the feet may improve spontaneously by rest in bed. The best topical treatment, he said, is phenylmercuric borate 1:500 with 1 per cent boric acid in vanishing cream.

Shapiro and Rothman,[14] in 1945, stated that zinc undecylenate 20 per cent and undecylenic acid 5 per cent in a vanishing emulsion (a proprietary remedy) cured 86 per cent of the cases of tinea pedis and tinea cruris in four weeks. Relapses did not occur if the treatment was continued.

Hillegas and Camps[15] found Brilliant Green was 12½ time, and gentian violet 2½ times, more fungistatic than undecylenic acid; and sodium salt of 2 chloro-4 phenyl phenol, 5 times more fungicidal than undecylenic acid.

In the treatment of tinea pedis, Schwartz and his associates at present are successfully using as fungicides both salicylanilide 5 per cent in Carbowax 1500 and saturated solution of copper undecylenate in Carbowax 1500.

In this review of the literature, what progress is indicated in the treatment of tinea pedis? Today there is less use of salicylic acid and other keratolytics which are not fungicidal and tend to inflame an already injured skin. It is preferable to employ manual removal of dead epithelium and to open the vesicles and blebs so as to enable the fungicide to act on the fungus.

A host of new, powerful, comparatively nonirritating fungicides have been added to our armamentarium. The efficacy of our ointment bases has been increased by the addition of the synthetic wetting agents which enable the fungicide to better attack the fungi.

Individual treatment, according to the needs and clinical symptoms of the patient, is stressed. One stereotyped remedy or form of treatment for all cases is no longer advocated. Inflamed skin caused by fungous infection is now treated by soothing applications, and fungicides are applied only after the acute symptoms subside.

Notable among the many new fungicides are propionic and undecylenic acids, and their sodium, zinc, and copper salts, the chlorophenols, the brom cresols, the phenyl phenols, the phenyl mercuric salts, the organic zinc compounds, the organic copper compounds, such as copper naphthenate, copper pentachlorphenate, etc., and the quaternary ammonium compounds.

It is not difficult to clear up a case of tinea pedis by the judicious use of wet dressings and these modern fungicides. But as recurrences and reinfections often occur, prophylaxis is stressed. The patient is instructed in foot hygiene. He is told to keep the feet dry, especially the interdigital spaces; to manually remove dead epithelium, which is the breeding place of fungi; and to avoid walking barefooted in public bath houses. These preventive measures also should be practiced by people who are free from athlete's foot. Foot baths in public showers, fungicidal mats, sprays, and fungicidal flooring have been found of no value in the prevention of athlete's foot.

Tinea capitis

The treatment of tinea tonsurans advised by Duhring in 1883[2] was manual epilation of diseased hairs and topical applications. He stated that sulfur, ammoniated mercury, creosote, phenol, mercuric nitrate, and iodine were used as fungicides. The chronic patches were painted once a week with glacial acetic acid or with cantharides in collodion and the above fungicides were applied daily. He knew that tinea tonsurans usually disappeared at puberty.

Corlett, in 1899,[16] advised segregation of infected children, or enveloping the scalp in impervious medicated dressings held in place by a skull cap. He stated that the hair should be clipped close or shaved and the diseased area should be manually epilated. He advised that the scalp should be cleansed daily with soap and water, dried, and benzine applied, followed by the parasiticide. As parasiticides, he used phenol 4-6 per cent, copper oleate 20 per cent, or mercuric oleate 20 per cent in vaseline. He also used formalin in 5-15 per cent solution.

Schamberg, in 1917,[3] stated that Sabouraud, in Paris, was able to cure tinea capitis with one X-ray treatment. Schamberg himself treated the disease by manual epilation of the diseased hairs and the application of parasiticides. He used betanaphthol 12 per cent, tar 35-50 per cent, chrysarobin 4-7 per cent, phenol 5 per cent, and oil of cade. He stated that none of these medications is superior to another. It is the perseverance and the thoroughness in the use of the preparations that produce a successful result.

Darier, in 1920,[17] stresses that prophylaxis necessitates the immediate strict isolation of the patient. He treated tinea capitis by cutting the hair short every 8 to 10 days. He painted tincture of iodine over the entire scalp every day; and applied an occlusion dressing of iodized vaseline or chrysarobin ointment. He stated that where X-rays were available, epilation by means of X-ray was the method of choice.

Sutton, in 1927,[4] stated that combs, brushes, interchange of caps, and barber shops were the main sources of infection. He explained that the infected hairs must be removed so that antiseptics can attack the parasites in the bottom and sides of the hair follicle. He said that epilation is best done by X-rays, but that barium sulfide or frequent shaving of the head may be used. He did note consider justifiable the administration of thallium acetate to epilate the scalp, although it is at present the method of choice in Mexico City. He considered that iodine, ammoniated mercury, chrysarobin, sulfur, tar, and betanaphthol were the best fungicides.

These authorities represented the most advanced thought on the subject up to the beginning of World War II.

In 1941, Livingood and Pillsbury,[18] observed 105 cases of the non-inflammatory type of tinea capitis caused by *M. audouini*, and found that 27 per cent were cured spontaneously without treatment in from three months to two years. As fungicides, they used tincture of iodine, with and without 2 per cent aerosols, iodine ointments with wetting-agent bases, phenyl mercuric nitrate, ammoniated mercury, sulfur, and salicylic acid. They noted no consistent good effect from any single type of these fungicides. And they recommended X-ray epilation when available.

In 1942, a rapid increase in the occurrence of ringworm of the scalp was noted, especially in large eastern cities. The epidemic spread. By 1943 reports came to the Public Health Service of epidemics in smaller cities as far west as the Mississippi River. This sudden outbreak, of course, stimulated renewed interest in the therapy of the disease and its epidemiology.

Poth and Kaliski [19] treated 15 cases of tinea capitis in 1942 with daily oral doses of 5000 I.U. of estrone and the daily application of an ointment containing 5000 I.U. per gram. They also treated 15 cases with daily oral doses of 75,000 I.U. of diethylstilbestrol and the application of an ointment containing 4000 I.U. per gram of this drug. They report that all were cured except two patients who had discontinued treatment.

Keeney and Brayler [8] stated in 1943 that they used effectively sodium propionate in the treatment of tinea capitis.

In 1944, Schwartz, et al., of the U. S. Public Health Service, were requested to undertake an experiment in Hagerstown, Maryland, to find the method of spread, and formulate a method to control the epidemic that was present in that city. They made a preliminary report in 1945;[20] the final report was published in 1946.[20a]

This epidemic consisted of more than 600 cases or about 10 per cent of the children in the city's grade school. It was controlled in one year by topical applications. This was done without barring infected children from school or other public places. No X-ray epilation was used. Two years after the experiment began, all the children were cured except 15 who refused treatment.

It was found that the electric clippers in barber shops were the chief sources of infection. Seventeen different topical applications were tried, including zinc undecylenate and undecylenic acid, sodium propionate and propionic acid, copper oleate, colloidal iodine, a number of quaternary ammonium compounds, pentachlorphenol, phenyl mercuric salicylate, copper oleate, copper undecylenate, and salicylanilide. Copper undecylenate and salicylanilide in a base of Carbowax 1500 were the most efficacious remedies used. The children were treated daily in the schools by trained attendants who clipped the heads of infected children every ten days.

McKee, et al., in 1946,[21] reported that by using trimethyl cetyl ammonium pentachlorphenate they cured 54 per cent of their cases, but stated that X-ray epilation was preferred.

Carrick reported in 1946 [22] that he cured 41 per cent of his patients with copper oleate, 40 per cent with zinc undecylenate and undecylenic acid, 59 per cent with sodium propionate and propionic acid, and all in about 130 days. But he stated that none of these ointments should be considered a substitute for X-ray epilation.

Lewis and Hopper [23] found that no treatment for tinea capitis caused by *M. audouini* offered as much promise of prompt cure as the regimen which includes X-ray epilation. In their textbook,[7] they advocate manual epilation and application of 10 per cent ammoniated mercury for small patches, X-ray epilation, and 3 per cent ammoniated mercury for larger areas.

Miller, et al.,[24] tried dinitro cyclohexylphenol, sodium propionate, undecylenic acid, trinitrophenol, benzoic and salicylic acids, and iodine and mercury. But they effected no more than 12 per cent cures. They advocate topical therapy as an adjuvant to X-ray epilation.

Strickler reported 64 per cent of cures with a mixture containing:

Iodine	78
Red blood cells	2
NaCl	1.9
Chlorophyll	2
Deceresol	10
MgO_2	8
Spleen extract	0.005

It can be seen from these reports that the treatment of tinea capitis has progressed. Cures are now attained by topical applications without X-ray epilation, or by administering thallium acetate. In order to attain a cure with topical applications, the treatment must be regular, frequent, and continuous over a period of several months. X-ray is a valuable therapeutic aid, but epilation without subsequent topical applications does not cure.

The cure by topical applications has been made possible by the introduction into medicine of powerful fungicides long used by industry as anti-mildew agents, synthetic detergents, and surface activating agents; and by penetrants also used in industry for carrying dyes into textiles. The object of epilation, by whatever means, is to remove the infected hairs and leave the follicle open so that the fungicides can enter and destroy the fungi on the sides and bottom of the follicle and prevent infection of the new growing hairs.

Clipping the hair close to the scalp (and burning it) removes much of the infection and permits the fungicides to be applied thoroughly to the scalp. The ointment bases contain wetting agents (many of which are also fungicides), which enable the fungicides to enter alongside the hair into the follicle and actually bring the fungicides in contact with the fungus. This obviates the need for epilation.

Children need not be kept out of school in order to prevent the spread of the disease. The original idea was to isolate infected children from non-infected children. This cannot be accomplished by excluding them from school because infected and non-infected children play together outside of school.

As the disease is spread by infected hairs, the following procedures are recommended: Hair of infected children should be kept closely clipped; caps should be worn; barbers should be instructed to sterilize their implements after cutting the hair of each noninfected child, and not to cut the hair of known infected children. Mothers should be instructed to shampoo the child's head thoroughly after each hair cut. By these measures, the chance of the infection spreading is greatly reduced. The need of keeping children from school will be nullified. Moreover, sending the infected children to school is advantageous because the school is a convenient place in which to treat the infected children every day, to check the progress of the disease, and to determine when a cure is effected.

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THERAPEUTIC RESEARCH FOUNDATION SET UP BY DRUG FIRMS

The Therapeutic Research Foundation, a non-profit drug research body organized for the scientific study and investigation of medicinal products, was incorporated recently in New York by a group of leading drug manufacturing firms.—*Drug Trade News,* Dec. 16, 1946.

Progress in Rickettsial Disease Therapy

With Special Reference to Para-aminobenzoic Acid

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STUDIES in the rickettsial diseases were greatly stimulated in this country by the United States entry in the recent World War. The possible exposure of our Armed Forces to epidemic typhus and tsutsugamushi disease forced attention on measures of prevention and control of rickettsial infections and hastened studies in the clinical course and therapy of these infections.

Clinical studies [1,2] have shown the importance of the intravenous use of plasma or albumin solutions in overcoming the serious effects of severe hypotension or edema. The importance of renal failure, the necessity for adequate hydration, and the need for and beneficial effects of a high protein diet, have been stressed.[1,2,3] The use of specific hyper-immune sera has shown encouraging results when given early in the clinical course of two rickettsial diseases, spotted fever,[4] and louse borne typhus.[5,5a]

In addition to supportive treatment and serum treatment, developments in the chemotherapy of rickettsial infections are of significance. In the past a number of drugs found beneficial in the treatment of a variety of diseases have been tried in the treatment of experimental and human rickettsial infections. None of the agents tried has been of proven value in the treatment of typhus or spotted fever. The sulphonamides were shown experimentally to increase the mortality from these infections.[6,7] One of the more recent chemotherapeutic agents, penicillin, has shown encouraging results in the treatment of typhus infected laoratory animals.[8] Methylthioninechloride (methylene blue) has likewise proved promising in laboratory infections,[9,10] but a disappointment in the clinical treatment of tsutsugamushi disease.[11] Penicillin given to a small group of louse borne typhus patients early in the clinical disease and administered for more than seven days has not given encouraging results from the standpoint of specific treatment, but on the other hand, penicillin was encouraging in the prevention or cure of secondary bacterial complications occurring during the course of typhus.

In 1942 Snyder, Maier, and Anderson [7] reported the effect of para-aminobenzoic acid in the treatment of murine typhus in white mice. The therapeutic effect of para-aminobenzoic acid in murine typhus was observed independently by Grieff, Pinkerton and Moragues.[8] These observations opened a new chapter in the therapy of rickettsial diseases. It is now known that this compound given either parenterally or in the diet to a variety of laboratory animals will protect them against otherwise fatal infections of epidemic or murine typhus,[7,12] Rocky Mountain spotted fever,[13] and tsutsugamushi disease. [14,15,16]

The mode of action of para-aminobenzoic acid on the rickettsias is only partially understood. It has been shown [8,17,18] that this compound inhibits the multiplication of rickettsias. Para-aminobenzoic appears to be not a rickettsiocidal but a rickettsiostatic agent. In clinical use it is assumed that the immunity mechanisms of the host finally overcome the infection, the progress of which is arrested by para-aminobenzoic acid. The development of complement-fixing antibodies and Proteus agglutinins in the sera of patients receiving this drug show no variations from untreated rickettsial infections.[19,20] The immunity which is present following rickettsial infections in animals treated with this drug further emphasizes that the immune response is uninfluenced by para-aminobenzoic acid.[16]

A large number of compounds closely related to para-aminobenzoic acid have been tested in laboratory infections. These compounds have had no effect on the course of these infections which could not be attributed to free para-aminobenzoic acid released by hydrolysis *in vivo*.[12]

The report by Snyder, Maier, and Anderson prompted a field trial of para-aminobenzoic acid in epidemic typhus in 1943. The results of treatment in 20 cases was published in 1944.[19] At the present time there are reports in the literature of the use of this drug in the treatment of twelve cases of Rocky Mountain spotted fever,[21,22,23] thirty-three cases of murine typhus,[24,25] and eighteen cases of tsutsugamushi disease.[26] The well controlled clinical trial of para-aminobenzoic acid in tsutsugamushi disease was most encouraging and confirmed in man previous experimental evidence of the beneficial effect of this compound in an often highly fatal rickettsial disease.

This paper summarizes certain details in the administration of para-aminobenzoic acid and briefly reviews the experiences of the United States of America Typhus Commission with this compound in the treatment of epidemic typhus over a period of three years.

From 1943 to 1945 ninety-five cases of typhus were given para-aminobenzoic acid over a period of more than four days in amounts sufficient to produce measurable levels of diazotizable substances in the blood. Studies on all but two of these patients were carried out by the United States of America Typhus Commission [27] in Egypt and in Germany.

THE FORM OF ADMINISTRATION OF PARA-AMINOBENZOIC ACID; THE DOSAGE; CONTRAINDICATIONS FOR THERAPY

In almost all of these cases para-aminobenzoic acid was administered as follows: chemically pure para-aminobenzoic acid in powder form was given by mouth in a 5 per cent solution of sodium bicarbonate. At least equimolar amounts of bicarbonate solution were given for each gram of the drug. In most cases the drug was mixed with 5 per cent bicarbonate solution at the bedside immediately before each dose. A few patients received the sodium salt, para-aminobenzoate, by mouth in a watery solution. In such cases no bicarbonate was administered unless the urine became acid in reaction during therapy. The initial dose of para-aminobenzoic acid was 4 to 8 grams. This was followed by a dose of from one to three grams every two hours day and night throughout the course of treatment. The amount given every two hours varied, depending upon frequent measurements of the blood concentration of the drug.

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The studies of the effect of para-aminobenzoic acid in typhus fever, referred to in this report, were carried out in collaboration with: D. H. Clement, R. S. Ecke, E. S. Murray, R. A. Phillips, J. C. Snyder, N. A. Tierney and C. J. D. Zarafonetis.

What is the optimum blood concentration of para-aminobenzoic acid? From clinical experience it is impossible to answer this question precisely. Some of the para-aminobenzoic acid is converted in the body to para-aminohippuric acid, which is entirely inert against the rickettsias of louse borne typhus, murine typhus, or tsutsugamushi disease in experimental infections.[12] It is known[12] that the minimum concentration of para-aminobenzoic acid required to achieve inhibition of multiplication in embryonated hen's eggs is approximately 5 milligrams per cent for *R. prowazeki* and *R. mooseri* and at least 35 milligrams per cent for *R. orientalis*. In the majority of the patients referred to in this report the blood levels were between 5 and 40 milligrams per cent. Until more accurate information is available, it is recommended that a blood concentration of between 10 and 20 milligrams per cent of para-aminobenzoic acid (as free diazotizable substances measured against a standard of para-aminobenzoic acid) be promptly attained and maintained throughout the entire course of therapy in patients with typhus fever. Blood concentrations of from 35 to 40 milligrams per cent are probably desirable for patients with tsutsugamushi disease, and, in the absence of more accurate information, for Rocky Mountain spotted fever as well. In typhus patients no untoward clinical effects and no greater incidence of leucopenia has been noted with blood concentrations of over 45 milligrams per cent than in patients with lower concentrations. Also, however, in typhus patients there is no evidence that concentrations above 20 milligrams per cent, in some cases as high as 50 to 70 milligrams per cent, are more effective in treatment.

Whenever circumstances permitted, blood concentrations of the drug were measured every four hours during the first twenty-four hours of therapy. Since the blood concentration rises and falls rapidly after each dose, venipunctures were performed just prior to a dose of para-aminobenzoic, that is two hours following the last dose. Although in some cases it was desirable to continue measurements of the blood concentration at intervals of four hours throughout the course of treatment, usually this was not found necessary provided that renal insufficiency was not present, that the urine output and fluid intake were reasonably constant from day to day and that the two hour schedule of dosage was strictly observed. Satisfactory blood levels were maintained after the first twenty-four hours of treatment by measuring the blood concentration just before each 8 A.M. dose. When azotemia was present or developed in patients receiving para-aminobenzoic acid it was found very necessary to measure the blood concentrations more than once every twenty-four hours, and to adjust the two hour doses accordingly since in these patients concentrations of the drug sometimes attained unnecessarily high levels due to delay in excretion. High blood concentrations were reduced either by reducing the amount of drug given at the two hour intervals or by omitting the drug for one or more doses.

It was found that intramuscular injections of a 20 per cent solution of sodium para-aminobenzoate in physiological saline adjusted to a pH of 7.0, and given at four hourly intervals was well tolerated. However, the blood concentration of the drug in these patients showed somewhat erratic values. This method of administration was not considered as successful as the oral route. In patients who have difficulty in swallowing, the administration of para-aminobenzoic acid by stomach tube has been successfully carried out.

We have given chemically pure sodium para-aminobenzoate in a 2 to 5 per cent solution in physiologic saline by constant intravenous drip. The rate of flow was adjusted to permit the infusion of 25 to 30 gm. of the drug in twenty-four hours. In our experience with four patients treated by this method the fluctuation in blood concentration was negligible when a constant rate of flow over the twenty-four hour period was achieved. The difficulties encountered by the intravenous form of therapy were chiefly those attendant upon prolonged intravenous infusions under field conditions. Under more satisfactory hospital conditions we believe that the intravenous administration of pyrogen free, buffered solutions of chemically pure sodium para-aminobenzoate would be a valuable adjunct to oral therapy in certain cases.

In the majority of patients the administration of para-aminobenzoic acid was continued until the temperature had been normal for twenty-four to forty-eight hours. When therapy was discontinued before this time a secondary rise in temperature lasting from a few hours to several days was encountered in some patients. In the absence of obvious complications this secondary febrile period probably represented a mild recrudescence of typhus. This phenomenon of a secondary fever following premature withdrawal of the drug has been noted to occur in patients with tsutsugamushi disease.[26]

We soon learned that the administration of para-aminobenzoic acid to typhus patients tended to depress the white blood cell count. In a few patients the white count fell to below 3000 cells per cubic millimeter either during or shortly following therapy. In a series [20] of twenty treated cases the percentage of polymorphonuclear cells was significantly reduced over the percentage in nineteen untreated control cases. Also the percentage of lymphocytes was significantly increased. Because of this effect of para-aminobenzoic acid on the white cells of typhus patients, white blood cell counts should be done daily on every patient receiving this drug. When the count falls below 3000 cells per cubic millimeter, differential counts should be done. In our experience these abnormalities in the white cells count never have been of serious import. However, our present belief is that when a fall in the white count below 3000, or a reduction of the polymorphonuclear cells below 25 per cent, occurs, serious consideration should be given to termination of therapy.

Freshly voided urine specimens of the patients under treatment with para-aminobenzoic acid were tested daily for pH. If the urine became acid, increased amounts of bicarbonate solution were given with each dose of the drug. The urine sediment was examined daily for the presence of para-aminobenzoic acid crystals. While we have not as yet encountered crystals in the urine of our treated patients, we would regard their appearance as an indication for immediate cessation of therapy.

THE EFFECT OF PARA-AMINOBENZOIC ACID ON THE CLINICAL COURSE OF TYPHUS FEVER

When para-aminobenzoic acid was administered to typhus patients during the first seven days of the clinical disease the febrile course of illness was significantly shortened.

In a study [20] of twenty treated patients and nineteen alternate controls observed in Egypt during 1944 and 1945, significant reduction in the height and duration of fever was observed in the treated cases. The mean age and duration of illness when admitted to the study groups were the same in the treated and control patients, yet the mean duration of fever for the treated patients was more than five days less than for the controls.

The complications or complicating conditions usually observed among untreated typhus patients were likewise significantly reduced, in the study referred to above. Such conditions as delirium, stupor, incontinence, nitrogen retention, marked hypotension were rarely observed among the treated patients, but were commonly observed among the controls. The death rate among the treated cases was likewise greatly reduced: one patient in the treated group died; while six of the nineteen patients in the control group died. In this study the clinical course of patients treated with para-aminobenzoic acid was more favorably affected if therapy was begun early rather than late during the first week of the disease. Although controlled data were lacking, preliminary evidence suggested that when para-aminobenzoic acid therapy was first begun after the eighth day of illness, there was little reason to anticipate a very favorable effect on the clinical course of typhus fever.

In May 1945 an opportunity was given to apply this experience with para-aminobenzoic acid in an epidemic of typhus fever in the Dachau concentration camp in Germany.[28] Therapeutic amounts of para-aminobenzoic acid were administered to sixty male patients with typhus fever. It was our impression that the patients at Dachau derived benefit from treatment with this drug. The clinical course of the sixty patients was classified as follows: thirty-four mild; fifteen moderate, and eight severe. Three patients died. These sixty patients had a shorter febrile course, fewer complications due to typhus, and fewer deaths that would be expected to occur in that large a group of cases suffering from classical louse borne typhus. The clinical course of those patients whose treatment was begun early in the disease was milder than that of patients whose treatment was begun late. It is unjustifiable to comment further on the possible benefit derived by these Dachau patients from treatment with para-aminobenzoic acid. It must be strongly emphasized that the use of this drug at Dachau was not intended as an experimental study. The horrible conditions found in this camp at the time of its liberation on April 29, 1945, are too well known to require elaboration. Starvation, typhus and tuberculosis claimed more than 100 lives daily. The medical staff of the U. S. Armed Forces which took over the hospitalization at Dachau did all in its power to alleviate the desperate situation by such measures as quarantine, mass delousing with D.D.T. and mass immunization. Probably most of the sixty patients treated with para-aminobenzoic acid received one or more doses of typhus vaccine during the incubation period of their disease before chemotherapy was begun. The Army hospitals in the camp were canvassed daily by Typhus Commission and collaborating medical officers, and the most severely ill patients who were still early in the clinical course of typhus were transferred to a special ward for chemotherapy and serum therapy. There was no thought of observing an alternate series of untreated control patients. The only objective in the administration of para-aminobenzoic acid was to save lives. Nevertheless, some important observations were made in the treatment of these sixty patients. Large doses of para-aminobenzoic acid were administered over a period of from three to thirteen days with no toxic effects except a transient lowering of the white blood cell count in some cases. It was not necessary to interrupt therapy during the febrile period because of nausea, vomiting or leucopenia. Some patients received more than 250 grams of the drug during the course of treatment. Concentrations of this compound in the blood, measured two hours after the preceding dose of the drug were higher than 60 mgm. per cent in several cases. Many of these patients were in extremely poor general physical condition, and were suffering from a variety of diseases besides typhus. The treatment of the sixty Dachau typhus patients confirmed our previous experience with this drug, namely that when given as outlined above para-aminobenzoic acid is an agent of low toxicity in typhus fever. Due to lack of control cases and to previous immunization in the incubation period of the disease, the impression of the beneficial effects of treatment in this group cannot be substantiated by adequate objective data. But the absence of any serious toxic effects from the drug in these cases was shown clearly.

In conclusion, several points in the administration of para-aminobenzoic acid for the treatment of rickettsial infections should be re-emphasized. The drug must be chemically pure. Better results are to be expected when therapy is begun early, rather than late, in the clinical course of typhus or tsutsugamushi disease; and this is very probably true also in the treatment of spotted fever. Blood concentrations in the range already alluded to should be maintained throughout the entire course of therapy. Evidence from experimental infections has shown this to be one of the most important factors in successful treatment. The urine should be kept neutral or slightly alkaline in reaction to avoid the possibility of crystal formation in the kidney tubules. The white blood cell count should be followed daily. With cell counts below 3000, differential counts should be done and serious consideration given to termination of therapy. In the absence of contraindications, treatment should be continued until the temperature has been normal for from twenty-four to forty-eight hours. The presence or development of secondary bacterial infections is not held as a contraindication for treatment with para-aminobenzoic acid. It is obvious that sulphonamides should not be used, but that penicillin is the drug of choice when organisms susceptible to its action are present .

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$3000 FOR A CURE

Whenever people begin to feel that the druggist is overcharging mercilessly they should be shown the price lists of the 17th century pharmacy. There is a record of a pharmacist collecting the equivalent of $7.50 for one pill. One box of capsules was sold for $150.00. However, when one realizes that many of these remedies contained a hundred or even three and four hundred different ingredients, maybe the price was warranted. Louis the 15th paid $1000 for a secret cure later sold to Catherine the Great for $3000. The cure is now known as tincture of ferric chloride. Another Frenchman, Louis 16th, paid $5000 for a drug to drive the worms out of his people. That was Apsidium, commonly called male fern.—From "Drugs Today, Dregs Tomorrow," by Edward J. Novak, in *MD,* November, 1946.

The General Medical Aspects of Atomic Energy

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RECENTLY I presided at a medical meeting to discuss the uses and dangers of atomic energy. The medical audience was the most sober and attentive I have ever seen. Obviously all of them were more or less aware of the fearful potentialities of atomic energy and they wanted to learn all they could about it.

THE CONSTRUCTIVE VERSUS THE DESTRUCTIVE USES OF ATOMIC ENERGY

We should recognize not only the power of atomic energy to benefit but also its power to destroy mankind. That which has fascinated us most concerning atomic energy is its tremendous potency. If any of you doubt the destructive power of atomic energy and think that the reports on the Hiroshima bombing were "mostly propaganda," you should know these facts. Of the 150 physicians in Hiroshima at the time the atomic bomb fell, sixty-five were killed and most of the rest were so badly injured that they could not treat other injured people. Of the 1,780 nurses, 1,654 were dead or too badly hurt to carry on.[1] General Groves's figures for the Hiroshima and Nagasaki bombings indicated an average of 68,000 people killed and 90,000 injured per bomb and, according to General Farrell, the bomb at Hiroshima produced "four square miles of absolute destruction and three more of serious damage."[2] In the official report[3] on "Atomic energy for military purposes," H. D. Smyth of Princeton University, consultant to the Manhattan District, said: "A weapon has been developed that is potentially destructive beyond the wildest nightmares of the imagination. . . . It is conceivable that totally different methods may be discovered for converting matter into energy since it is to be remembered that the energy released in uranium fission corresponds to the utilization of only about 0.1 per cent of its mass. Should a scheme be devised for converting to energy even as much as a few per cent of the matter of some common material, civilization would have the means to commit suicide at will."

This led Yates [4] to remark: "Civilization stands in the twilight zone between a possible Utopia and ultimate destruction. . . . Wholesale even planetary death has come to live among us."

Dr. Raymond D. Fosdick,[5] president of the Rockefeller Foundation, stated that the search for truth concerning atomic energy "has today brought our civilization to the edge of the abyss, and man is confronted by the tragic irony that when he has been most successful in pushing out the boundaries of knowledge, he has most endangered the possibility of human life on this planet. The pursuit of truth has at last led us to the tools by which we can ourselves become the destroyers of our own institutions and all the bright hopes of the race."

Fear is a strong factor in our concern with atomic energy and we should recognize that we *are* fearful. Fosdick said: "Now we are face to face with this urgent question: Can education and tolerance and understanding and creative intelligence run fast enough to keep us abreast with our own mounting capacity to destroy?"

At the opening session of the United Nations Atomic Energy Commission, Bernard M. Baruch[6] said: "Behind the black portent of the new atomic age, lies a hope which, seized upon with faith, can work our salvation. If we fail, then we have damned every man to be the slave of fear. Let us not deceive ourselves: we must elect world peace or world destruction. Science has torn from nature a secret so vast in its potentialities that our minds cower from the terror it creates. . . . Science, which gave us this dread power, shows that it can be made a giant help to humanity, but science does not show us how to prevent its baleful use. . . . Only in the will of mankind lies the answer."

Furthermore, Albert Einstein [7] has commented on the problem of atomic energy: "As Mr. Baruch wisely said, it is a problem not of physics but of ethics. . . . Science has brought forth this danger, but the real problem is in the minds and hearts of men . . . "

Having faced the fact that atomic energy possesses fearful potential dangers, what can we do about it? McGraw [8] sounded the keynote when he said: "We hold in trust a power that is capable of unraveling the very fabric of our civilization. Equally it may be susceptible of development as a mighty force for human welfare. But we have proved the destructive use while the constructive applications are still in the realm of speculation. At one giant stride our scientific and technological development has so far out-distanced our social engineering, that we have no choice but to turn our full powers of creative imagination to control the forces we have unleashed and to bend them to man's use rather than to his destruction."

We are only now making the first feeble efforts in this direction and as was mentioned in the Lilienthal report:[9] "We are probably no more able to foresee the ultimate fruits of development than were Faraday's contemporaries to understand what would come of the discovery of electro-magnetic induction."

There are two great fields for beneficial use: "the development of atomic energy as a controlled source of power" [10] and "the application of radiations and radioactivities to the growth of the sciences and practical arts." Atomic scientists believe that "it is probable that the exploitation of atomic energy as a tool for research will outweigh the benefits to be derived from the availability of a new source of power." They think that it would not be astonishing "if the greatest benefit of this pro-

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Read before the meeting of the American Pharmaceutical Manufacturers' Association, New York City, December 10, 1946.

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gram were in fact to lie in therapy for some of the neoplastic diseases, such as cancer, or in the increased understanding of biological systems or of the realities of the physical world, which will in turn open up new fields of human endeavor."

The Governmental Program in Development of Constructive Uses of Atomic Energy

It is perhaps well to know something about the government's plan for the development of research in the medical applications of atomic energy. Actually, although much has been accomplished, no final plans have yet been announced. The governmental developments started with the work of Section S-1 on Atomic Energy of the Office of Scientific Research and Development and continued with the activities of the Manhattan Engineering District Investigating Group. Then there was established the Secretary of War's Interim Committee on Atomic Energy.

Working with this Interim Committee, Manhattan Engineering District has developed excellent plans for making radioactive isotopes available for medical research. This led to the publication of an announcement from the headquarters of the Manhattan project on "Availability of radioactive isotopes."[11] Dr. Paul Aebersold has been secretary of the committee of scientists attempting to develop a suitable interim mechanism for allocation and distribution of radioactive isotopes.

Supplementing these developments, the office of Mr. Bernard M. Baruch, United States Representative to the United Nations Atomic Energy Commission, with Dr. Richard C. Tolman as scientific adviser, has prepared a number of extremely important reports, including volume 1 on general scientific information;[12] volume 3, a bibliography and check list;[13] and volume 5 on medical uses of atomic energy.[14] The final decisions with regard to the government's plan for development of research on the medical aspects of atomic energy will rest with the recently appointed five-man national Atomic Energy Commission under the chairmanship of Mr. David E. Lilienthal.

Fundamental Considerations with Regard to Medical Uses of Atomic Energy

A simple description of some of the recent developments in atomic energy assists one in understanding the general medical aspects. These have been well described by Bacher and Feynman.[15] Up until the time of the recent studies on atomic energy, scientists had been able simply to regroup atoms into new patterns. Now the nuclear physicists have discovered ways to transform atoms from one kind to another. This new ability to transmute the elements rather than just to rearrange them permits control over an entirely new group of natural phenomena.

Each atom consists of an electron cloud in the center of which is a heavy nucleus. There are approximately 600 known varieties of atoms. Many have the same kind of electron cloud but possess a different kind of nucleus. Two atoms that have different cores but similar electron clouds are called "isotopes." Different isotopes of a single element are usually distinguished by giving each a number. This number represents the weight of the nucleus. Thus, two hydrogen isotopes are known as H-1 and H-2. There are two principal isotopes of natural uranium, U-238 and U-235.

What the nuclear physicists have discovered is a way to change the nucleus of the atom. The new nucleus, however, may not be stable. When the nucleus changes, it may emit gamma rays. An isotope which is capable of changing from one kind to another is called a radioactive isotope. Since radioactivity can easily be detected with modern instruments, radioactive isotopes can readily be located among stable atoms. This ability to detect the presence of radioactive isotopes is of tremendous value in the solution of many biologic and chemical problems. Radioactive isotopes can be used in medicine and in scientific research as tracer elements.

Nichols and Ruhoff [16] have said that one of the most important by-products of the development of the atomic bomb is the fact that there are now available a host of new tools for basic research in many fields including medicine, chemistry and physics. New radioactive materials can be produced synthetically in a pile. Also, there have been produced new radioactive fission materials, new chemical and physical processes and new mathematical technics. In the sum total of their application, these new technical and engineering methods may be of greater value than the power potentialities of atomic energy.

Cohn [17] said that most of the radioactive species produced in a pile can also be made in a cyclotron. A few species appear in fission, however, which can not be made conveniently otherwise. The combined use of the pile and the cyclotron has brought the present list of radioactive isotopes to about 450. The important contribution of the pile is that it can make certain radioisotopes available in tremendous quantities.

By virtue of their radioactivity, radioisotopes can be detected at a distance from themselves. Therefore samples need not be purified to the extent necessary for ordinary physical or chemical analyses. Furthermore, the fact that each radioisotope has its own specific and unique type of radiation permits exact identification.

Of particular significance in medicine is the fact that the radiation from radioactive iodine extends outside of the human body and its approximate location can be detected by placing instruments on the surface of the body. For example, in studying the effect of radioiodine on the thyroid gland, the rate at which it enters and leaves the gland can be followed continuously. Such studies were impossible before the manufacture of radioactive iodine. Once the proper information was available, it led to a method of utilizing larger amounts of radioactive iodine in treatment for hyperthyroidism.

It has been stressed by Allison and by Cohn that there are tremendous possibilities in the utilization of radioactive carbon because among the many atomic species which make up living matter carbon occupies a unique position owing to the enormous number of compounds it can form. Cohn voiced the opinion that it is possible that discoveries made in researches with the carbon isotope C-14 may be as important and far-reaching as the discovery of fission itself.

THERAPEUTIC APPLICATIONS OF ATOMIC ENERGY

Rhoads and Solomon[18] stated that to date only two artificial radioactive isotopes have been proved conclusively to be of therapeutic value. These are phosphorus-32 with a half life of 14.3 days, and iodine-130 and iodine-131, with half lives of 12.6 hours and 8.0 days, respectively. Until recently, only limited quantities of these two isotopes have been available from the costly and time-consuming cyclotron bombardment. Now, existing piles can provide amounts of these isotopes which will be adequate for medical needs.

Of the disorders which can be treated effectively with P-32, polycythemia alone has been controlled for long periods. In leukemia, there is some evidence that treatment with P-32 results in fewer undesirable side effects than occur when roentgen rays are employed in therapy but there is no greater prolongation of life. Radioactive iodine is notably successful at present only in the treatment for hyperthyroidism. Cancer of the thyroid gland, on the other hand, has not been cured by treatment with radioactive iodine, though a noticeable palliative effect is apparent in a very few cases.

Hall and his associates at the Mayo Clinic have employed radioactive phosphorus as a therapeutic agent since 1941. The most favorable results have been observed in polycythemia vera. Of 103 patients treated to date, 80 per cent obtained satisfactory remissions lasting from five months to four years. Partial remissions were obtained in the remaining 20 per cent. With recurrence of the polycythemia months or years later, remissions were induced a second time following subsequent treatment with the isotope. In the chronic forms of leukemia, remissions similar to those observed following roentgen therapy were induced with radioactive phosphorus.

Rhoads and Solomon mentioned significantly that "the very fact that two forms of cancer, leukemia with its allied disorders, and thyroid cancer are now treated with radioactive isotopes suggests, however, that other types of neoplastic disease may be found to be susceptible in the future. In particular, the synthesis of radioactive elements into compounds which already have a demonstrable physiological effect on neoplastic disease must be explored." They added that it was easy to imagine that radioactive isotopes might be provided as a simple substitute for roentgen rays in photography and thought that it might be possible in remote parts of the world where conventional X-ray apparatus is not available, to provide a safe, simple and inexpensive method of taking ordinary X-ray films.

At the Mayo Foundation, Higgins, Larson and Keating have conducted studies dealing with various phases of the employment of radioiodine in the diagnosis and treatment of thyroid disease. These studies have thrown considerable light on the manner and rate by which inorganic iodine is converted into di-iodotyrosine and thyroxin. The method has been and is receiving extensive use in investigating the relationship between the thyroid gland and the anterior hypophysis. It has been the definitive tool for showing the mode of action of thiouracil and other thyroid inhibitors.

Radioactive iodine appears to have a definite place in the treatment of exophthalmic goiter, at least in certain selected cases. These will probably include patients for whom thyroidectomy represents an excessive risk, either by reason of the seriousness of the hyperthyroidism or because of the existence of serious complicating conditions such as heart disease. It may prove to be the method of choice for treatment of patients whose hyperthyroidism has recurred after thyroidectomy. In this latter group, results obtained with thiouracil have been particularly disappointing.

THE EMPLOYMENT OF ATOMIC ENERGY IN MEDICAL RESEARCH

Greatest emphasis should probably be placed on the promise afforded by the use of isotopes as tracers in the fields of pure chemistry and biologic and medical chemistry. The value of these new tools for acquiring information has so broadened the fields of chemistry and physiology that one can anticipate almost limitless advances. Certainly the ability to investigate the dynamic equilibrium of chemical and biologic processes has brought us to a new frontier. At the Mayo Foundation, Bollman has employed radioactive phosphorus in the study of the metabolism of resting and exercising muscles, the permeability of muscle during shock and many problems of phospholipid metabolism. He was in agreement with the editorial in the *Bulletin of the Atomic Scientists* which stated:[19] "The most significant uses of artificial radioactive materials will be in laboratory researches in which the tagging of atoms through their radiations will enable technical advances to be made whose very nature cannot be predicted at this time."

THE DELETERIOUS EFFECTS OF ATOMIC ENERGY

Finally, from the general medical standpoint, all physicians will be interested in the possible deleterious effects of atomic energy on human beings. Since Warren will discuss "Physiologic reactions to radioactive isotopes," I shall touch on only one phase of this subject. It was my privilege recently to hear Sir Lionel Whitby,[20] hematologic consultant to the British Atomic Energy Station at Didcot, talk on "The Hematological Effects of Radiation." He said: "The effect of various radioactive substances on the living organism has become a matter of universal importance and of interest to every living being since the crucial decision was made to use atomic energy for warlike purposes." He added that it must be borne in mind that nuclear physicists are now working with rays or ionizing particles the exact capacity of which for damage is quite unknown. Such irradiations influence cytochemistry, chromosome development and gene mutation. In examinations of the blood, at least as much significance should be attached to the appearance of any bizarre or unusual white corpuscles as to the more commonly reported changes in their total number. All experimental evidence to date suggests that the damaging effects of radiation are exerted on the young, dividing cells rather than on the mature cells which are circulating. Damage at an early stage, if it does not kill the cell, may render it incapable of complete maturation. It is generally considered that the lymphocyte is the most radiosensitive cells, because reduction of number of lymphocytes is the earliest, the most marked and the most consistent blood change induced by therapeutic doses, but lymphocytes are able to recover rapidly. Whitby remarked that nuclear physicists are notoriously careless about their own protection and most of them are only vaguely aware of the hazards of their occupation—an observation I have heard made by Allison and Warren. Whitby also described briefly the effects of radiation on the reproductive system. In the male the gonads may be affected and spermatogenesis may be stopped. Even complete atrophy of the seminiferous tubules has been observed in some cases. In the female miscarriages may occur. Insidious chromosome and gene mutations may be produced which may affect progeny for several generations.

Conclusions

I may conclude by reiterating that our nuclear scientists have unleashed a mighty power for evil or for good and that we must exert every effort to make certain that the potentialities for good are those which are developed. Already in the field of medicine we have a number of promising leads for utilization of atomic energy in therapy, and even brighter vistas open before us in the field of medical research. Perhaps this association will be in a position to exert leadership in diversion of the enormous forces of atomic energy from warlike to peaceful scientific pursuits, for, as Fosdick has said, this is "the mighty imperative of our time."

In closing, I should like to read the appropriate verses on "Atomic Power"[21] by Thomson King.

Before recorded history began
Prometheus, symbol of Science, brought us fire,
The altar and the hearth were our desire;
On these were built the faith and hope of man.
Then wood and stone and bronze and steel and steam
In turn became the servants of our will;
Knowledge we got and with it thought to fill
Each need and want, to realize each dream.
Again Prometheus brings a magic gift,
Which scarce we know if we should ban or bless.
The boldest hesitate, the fearful cower,
Before this weapon, deadly, sure and swift.
Amazed we stand, appalled at our success;
For who are we to wield this cosmic power?

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DEATHS FROM INFECTIOUS DISEASES

Deaths from the major infectious diseases declined to new lows in 1945. The year set a record low for pneumonia and influenza. The total of 68,386 deaths from these respiratory causes was 8.2 per cent less than the previous minimum of 74,532 deaths in 1942 and 16.4 per cent less than the number reported for 1944.—*U. S. Public Health Service.*

Nuclear Physics and Medical Research

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UNDOUBTEDLY there will be later very important developments in nuclear physics which at present cannot even be imagined. When Roentgen discovered X-rays he soon found that a photograph of a human hand taken with the new rays revealed the contour of all the bones. After that it was not hard to imagine how with improved apparatus and further study X-rays would become very useful in the diagnosis of disease. However, no one at that time could have possibly predicted that X-rays would play an important part, for instance, in the development of synthetic rubber or nylon. That came about simply because some physicists were curious about the nature of the new rays. Were they waves like light? If so, it should be possible to obtain diffraction patterns by passing them through a crystal, argued von Laue. Friedrich and Knipping tried it and found it so. Many new discoveries followed this observation. Then the process was reversed and X-rays were used to study crystals; then to study the structure of all sorts of materials. Chemists learned more about the shape of molecules and how to alter them to produce desirable characteristics, such as stretching in the case of rubber. Today the X-ray spectrometer is an indispensable research tool in every industrial laboratory.

Now, from the work that has already been done with radioactive isotopes and other tools of nuclear physics, it is obvious that they will be very valuable in medical research. But physicists, chemists, biologists, and all sorts of people will try innumerable experiments to satisfy their curiosity about something or other in connection with these tools, and some of them will discover new phenomena that will expand the field in different directions—totally unpredictable at present. It is very important, for this reason, that "free" research, untrammeled by directives or utilitarian objectives be encouraged and nurtured.

The widespread use of radioactive isotopes involves health hazards of an insidious nature. Ionizing radiations, which they emit, injure living tissues but at the time of the exposure the individual has no sensation or warning of any kind. Furthermore the injury does not manifest itself for days, weeks, months or even years. In fact if the injury occurs in the germ cells it may become apparent only in subsequent generations. Enough is known today to prevent direct injury to anyone working with ionizing radiations. Less, but still a good deal, is known about the distribution of radioactive isotopes taken into the human body and the injuries they may produce through the radiations they emit. Great caution must be exercized when radioactive substances *per se* or in chemical compounds are introduced into the body for any purpose whatever. We must avoid the tragic results that followed the drinking of radium water, which at the time was advertised as a magic remedy for many obscure ailments. It is important to remember that in these cases, no injurious effects were noted for a period of years and then cancer developed.

As you all know carbon is a chemical component of practically every drug produced today. A radioactive isotope of carbon C-14 is now available and in principle it may be incorporated in any organic compound. Food —let us say sugar—or a drug containing some radioactive carbon may be administered to a person to study its course through the body. Now, C-14 has a very long life (after 4000 years about one half of the initial amount still remains) so that if it is not eliminated completely by the body, some at least will continue to irradiate tissues throughout the individual's life. What will happen depends on the amount retained and its location. There is practically no experimental information available on this point. For this reason the committee on isotope distribution set up by the Manhattan District has recommended that no C-14 is to be administered to human subjects until sufficient animal experimentation will have provided the basis for safe use.

Carbon fourteen presents other difficulties. If it becomes incorporated in living tissues, some will be transformed into CO_2 through ordinary metabolic processes and will be exhaled into the atmosphere. In a laboratory where many experimental animals are present this may constitute a health hazard for the workers. At any rate the presence of a radioactive gas in a laboratory where delicate radiation instruments are used is very undesirable. Therefore, provisions should be made to remove CO_2 from the air.

It is certain that radioactive isotopes will be used in the future for all sorts of purposes. They will be used because of the fact that they emit radiation. Human beings have been exposed from time immemorial to the radiations of radioactive substances in the earth and to cosmic rays, but the intensity of these naturally occurring radiations is very low. If, by the widespread use of atomic power and radioactive isotopes, we raise the level of ionizing radiation to which the population is exposed, we shall have to consider seriously the influence on future generations. Exposure to ionizing radiation has a cumulative effect on the germ cells. Mutations in the vast majority of cases produce inferior individuals. We must indeed be wise in the Atomic Age to avoid sudden extermination in an atomic war or slow deterioration and possibly eventual extinction of the human race.

Summary of address presented at the Midyear Meeting of the American Pharmaceutical Manufacturers' Association (Atomic Energy Forum), New York City, December 10, 1946.

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The Physiologic Reaction to Radioactive Isotopes

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The radioactive isotopes are at present the most useful tool for medical and biologic research available to us. In addition, they hold some promise as a means of specific radiation therapy of certain disorders.

I shall review briefly what is meant by radioactive isotopes. These are elements having the same chemical properties as the normal element but differing from it in physical composition. The radioactive isotopes are unstable, and as a result of that instability give off radiations of alpha, beta or gamma type neutrons. The bulk of radioactive isotopes which have been found useful up to the present time give off either beta or gamma radiations.

These radiations are not given off all at once but are liberated in orderly fashion, each isotope having a characteristic and unchanging rate of emission. It is convenient to consider them from the standpoint of the half-life, or point at which 50 per cent of the material has delivered its radioactivity and become inert. In weighing the isotopes as either research or therapeutic tools, it is important to consider the range and type of radiation given off, the length of the half-life, and the chemical properties of the material. A substance that has too short a half-life cannot be worked with effectively. One that has too long a half-life will either not deliver its radiation at a rate sufficiently high to be significant from the therapeutic standpoint, or it will not be safe to use because of the prolonged character of the radiation.

Selective absorption of a given element is also an important aspect from the therapeutic standpoint. Thus, a radioactive material introduced into the body has no advantage over external total body radiation unless there is selective deposition of it in certain regions in which it is desirable to concentrate the radiation. Other aspects to be considered, of course, are the possible toxic effects of the material; thus, radium or radon, long available, have not been feasible to use either as tracer substances or for internal therapy because of their high toxicity, their slow excretion, and the prolonged radioactivity associated with them and their breakdown products.

Let us take radioactive phosphorus as an example and see how it has come to be perhaps the most widely utilized for therapy of the various radioactive isotopes. First, phosphorus is a normal constituent of the body. Second, the half-life of the radioactive phosphorus is 14.3 days, a long enough time to permit the necessary technical manipulations to be carried out prior to its administration and short enough to avoid any long-range toxic effects. The material is absorbed approximately ten times as much by certain rapidly growing types of cells, as for example, the white blood cells in leukemia, as by cells growing at a normal rate. Finally, the end-product of the phosphorus is inert sulphur, which again is a harmless and normal constituent of the body. As an added point, the beta radiation given off by P-32 is of relatively limited penetration, so that it exerts its injurious effect on tissues in close proximity to the region of its absorption.

Regardless of the means of administration and the chemical form in which given, all radioactive isotopes produce their physiologic effects through ionization of protoplasm. This ionization probably is effective through disruption of enzyme systems. Cells are injured in several ways. A vital portion of the nucleus may be damaged with cell death resulting; chromosomal alterations may be induced that show no effect in that cell itself but will be apparent in abnormalities of descendants of that cell; alteration in cellular function may be produced. Alterations of function only are not of primary importance in the tumor cells themselves, but may be very important if they affect the fibroblasts adjacent to the tumor.

One result of irradiation of fibrous tissue cells is the production of an abundance of intercellular collagen with hyalinization of that collagen. This is one of the important effects of radium or X-ray in the treatment of tumors. Not only do they directly damage the tumor cells but also they induce local fibrosis by the supporting cells of the tumor which hampers the spread of the tumor and interferes with nutrition except by the tumor cells. Similarly, damage may be done to blood vessels carrying nourishment to the tumor.

Radioactive iodine has been found to be useful in the therapy of certain disorders of the thyroid gland because of the avidity with which the thyroid picks up iodine. Thus, it has been possible to concentrate radioactive iodine by selective absorption in the hyperplastic thyroid gland and in certain tumors of the thyroid and their metastases. Deposited there, irradiation of the thyroid cells ensues, with regression of their hyperactivity, at least for a time.

In the case of sodium, on the other hand, there has been relatively little therapeutic use, because the high diffusibility of sodium and the absence of selective absorption of it by body cells has given it no advantage in therapy over the administration of total body radiation.

While the therapeutic value of numerous other radioactive isotopes remains to be explored, it is probable the chief value of these new substances lies in their use as tracer substances to facilitate research.

In the therapy their value is limited by the relative infrequency of diseases for which they are effective, by the need for detailed control of their use by physicists

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Presented at the Midyear Meeting of the American Pharmaceutical Manufacturers' Association (Atomic Energy Forum), New York City, December 10, 1946.

*Pathologist at New England Deaconess Hospital; and Assistant Professor of Pathology at The Medical School, Harvard University.

as well as medical men, and by the steady loss of radioactivity that makes storage and distribution costly and difficult.

The aim of the tracer technique is to use the radioactive material in too small an amount to have cellular alterations induced by the radioactivity, but to use that activity, as determined by a highly sensitive instrument such as the Geiger Counter, to follow through the body the movements of the particular molecules containing the tracer substance. By the appropriate selection of isotopes it is possible to tag and trace more than one of the atoms incorporated into a given molecule. Thus, by using radioactive zinc in protamine zinc insulin, it is possible to follow the distribution of the zinc insulin complex until it has been split off from the molecule.

By feeding minute amounts of radioactive iron it has been possible to make the hemoglobin of red blood cells radioactive so that the period of survival of transfused red blood cells may be accurately determined. This was of major use in the development of ACD solution that made possible the shipments of large amounts of whole blood from this country to our battlefronts in Europe and the Pacific.

By combining radioactive carbon in the molecule of glucose, it has been possible to make important advances in our understanding of carbohydrate metabolism in the body.

These few examples will perhaps suffice to indicate what a wide and startling range of biologic research has been opened by these substances. The incorporation of suitable radioactive elements in hormones, in vitamins, in drugs, as well as specific foods will permit a far greater knowledge to be obtained of their distribution in the body and the mechanism of their action than could have been attained by any other method.

. . . MEET OUR CONTRIBUTORS . . .

Dr. Donald C. Balfour is Director, Mayo Foundation for Medical Education and Research; graduate, Toronto Canada, 1906, (M.D., D.Sc.); associated with Mayo Clinic since 1906; member, A.M.A., Association of Surgeons of Great Britain and Ireland, Central Surgery Association, Society of Clinical Surgery, Southern Surgical Association, Western Surgical Association, American College of Surgeons, Royal College of Surgeons (England).

Dr. Isaiah Bowman is president of Johns Hopkins University, Baltimore, Maryland; graduate, Harvard, 1905, (B.S.), Yale, 1909, (Ph.D.), other honorary degrees; president, Johns Hopkins, 1935; renowned for work in physiography, regional geography, political geography.

Dr. Gioacchino Failla is professor of Radiology and Director of Radiological Research Laboratory, Department of Radiology at the College of Physicians and Surgeons, Columbia University; graduate of Columbia University Engineering School, 1915, (E.E.), graduate school, 1917, (M.A.), University of Paris, 1923, (D.Sc.); Janeway Lecturer, American Radium Society, 1939; president, New York Electrical Society, 1940; Caldwell Lecturer, American Roentgen Ray Society, 1945; member, Sigma Xi, American Physical Society, American Association for Advancement of Science, American Radium Society, Optical Society of America, American Roentgen Ray Society, Radiological Society of North America, New York Academy of Sciences.

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Dr. Chester S. Keefer is Wade professor of Medicine, Boston University School of Medicine; graduate, Johns Hopkins, 1922, (M.D.); consulting physician, U. S. Public Health Service, U. S. Marine Hospital, Brighton; member, American Clinical and Climatological Association, A.M.A., American Society for Clinical Investigation, Association of American Physicians, Society for Experimental Biology and Medicine, American College of Physicians.

Dr. Frank H. Krusen is Head of the Section on Physical Medicine, Mayo Clinic; professor of Physical Medicine, Mayo Foundation, University of Minnesota; Director of Baruch Committee on Physical Medicine; National Consultant on Physical Medicine to the Secretary of War; National Consultant on Physical Medicine to the Veterans Administration; graduate of Jefferson Medical College, 1921, (M.D); member, Council on Physical Medicine of A.M.A., Committee on American Health Resorts of A.M.A., American College of Physicians, American Association of University Professors, American Association for Advancement of Science, American Congress of Physical Medicine, Academy of Physical Medicine, American Rheumatism Association, Board of American Registry of Physical Therapy Technicians; received the Gold Key Award of American Congress of Physical Medicine in 1944.

Dr. Louis Schwartz is Medical Director, U. S. Public Health Service; Chief, Office of Dermatology, Industrial Hygiene Division, U. S. Public Health Service, Bethesda, Maryland; graduate of Jefferson Medical College, 1905, (M.D.), and has been in Public Health Service for 41 years; Diplomate, American Board of Dermatology and Syphilology; Fellow, A.M.A., A.P.H.A., American Academy of Dermatology and Syphilology, American College of Allergists; member, all dermatologic societies; consultant in dermatology; professor and lecturer; author of articles on occupational and related dermatoses.

Dr. Wesley W. Spink, guest editor, is professor of Medicine, University of Minnesota Medical School; associated with University Hospitals since 1937; specialty, Internal Medicine; graduate of Harvard Medical School, 1932, (A.B., M.D.); graduate work, Thorndike Memorial Laboratory, Boston City Hospital, 1934-37; chairman, Committee on Brucellosis, National Research Council; president, Minnesota Pathological Society; secretary, American Society for Clinical Investigation; member, Association of American Physicians, American Clinical and Climatological Association, Minnesota State Medical Association, Hennepin County Medical Society; awarded research grant, U. S. Public Health Service, for research on brucellosis.

(Continued on page 73)

Contributions of Chemistry and Physics to Medicine

Isaiah Bowman, Ph.D., Sc.D., LL.D.*
Baltimore, Maryland

There are two kinds of scientific relationships which form the polarities of this address. The one concerns general progress in knowing and discovering; the other concerns the interplay of disciplines or the bearing of a discovery in one field upon progress in another. One of my dearest memories is that of the late George Ellery Hale, Director of the Mount Wilson Observatory, to whom such interrelationships of disciplines and discoveries became almost a passion as he saw processes and instruments useful in solving the problems of one field also successfully employed in another. The spectroheliograph was one of his outstanding inventions and the wide use today of the principle it involves gives his judgment on this point a prophetic quality.

The principle of cross-fertilization in scientific research is further illustrated in the study of high-altitude effects. In 1907, when I made my first field studies in the Central Andes, the internal combustion engine was in a relatively early stage of development: there were about 50,000 passenger automobiles in use in the United States where there are now 25 millions. Langley's theoretical work in aeronautics had not been translated into practical flying, and the Wrights had made their first flight but four years earlier. Flying at that time had neither the engine efficiency nor the developed aerodynamical science behind it to permit attainment of high altitudes and the study of high-altitude physiological effects under actual operating conditions. Who could have estimated in the first decade of the century that within so short a period these effects were to become an object of fundamental study because of the spectacular and rapid development of the aeroplane and its commercial and military use on a vast scale? We thought first of high-altitude effects in terms of the discomfort of lowland people who journeyed to altitudes above 10,000 feet. We had not then concentrated upon the physiological and anatomical adaptations of a man born at a high altitude, nor upon the application of studies upon his conditions of fitness to the training of flyers and the development of aviation medicine.

Recently Dr. Carlos Monge of Peru has emphasized the infertility of some of the first settlers on going to the high Central Andes in the sixteenth and seventeenth centuries, and likewise the infertility of animals (sheep, swine, fowl), imported from the lowlands in the early days of the Conquest. By a long-continued process of adaptation and natural selection there developed over the centuries a native type of man who leads a normal life at a high altitude and is as remarkably ill-adapted to the lowlands as the lowland man is ill-adapted to the highlands. I mention this particular form of adaptation because it is in the early stages of analysis by scientific methods. Only after hundreds of years of aversion toward high-altitude effects of peoples in the lowlands and of high-altitude peoples toward lowlands, are we sufficiently aware of an important double process of historical acclimatisation that affects the health and welfare of many millions of people.

The modern study of these interesting phenomena has not been stimulated alone by the desire for new knowledge. It has been stimulated also by the greater mobility of populations today, the wider range of need, and by new tools of study put into our hands by modern disciplines, particularly the tools of physics and chemistry as applied for the most part by physiologists and climatologists. We are pushing out the limits of human endurance today in the occupation of the earth, in flights to high altitudes, in supersonic speeds of aeroplanes, and in the garnering of the wealth of the earth. The limit of speed and endurance is now the man, not the physical instrument. The work in The Mayo Foundation laboratories contributed much to the use of adequate protective devices, the BLB mask and studies on blackout and G problems, aimed at the prevention of unconsciousness in fighter pilots in the closing stages of the recent war, to mention but a few of the results of the Acceleration Unit of this great Foundation.

Most of us have felt at least a touch of the malady called mountain sickness. We have felt the stresses of what has been called our "internal environment" and the need for buffers of different kinds if there is to be free communication between highlands and lowlands in the full development of the economy of high plateaus and of transport across them.

The balances maintained by what we call our internal environment are among the most exciting demonstrations of science. Their identification and measurements represent basic medical research at its best. Along with other discoveries they have made us aware of the critical importance of the medical meanings of balance and of the invasions of disease that disturb the balance, as well as the drugs and the medical care that aid nature in restoring it. The conditions of cell life being very restricted, the highly organized life of the body has developed mechanisms for maintaining within us a tolerable environment for the functioning of our cells. The bacteriologist, the immunologist, the chemist, the physiologist, the pharmacologist and the practitioner here meet on common ground and what they have done for all of us in providing readily-accessible safeguards has, medically speaking, given us a new world in which to live as compared with the world of even fifty years ago.

It is against this vast and intricate tapestry of achievement that we throw into relief the distinguished work of The Mayo Foundation for Medical Education and

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Presentation address delivered at the Midyear Meeting of the American Pharmaceutical Manufacturers' Association in connection with the presentation to the Mayo Foundation of the APMA's Eighth Annual Scientific Award, at the Waldorf-Astoria Hotel, New York City, December 9, 1946.

*President, The Johns Hopkins University.

Research which we have met today to honor through the sponsorship of the American Pharmaceutical Manufacturers' Association.

I have mentioned results of aeronautical significance. If we go back a little further in the work of The Mayo Foundation we observe an achievement of 1927-29, the isolation of glutathione in crystalline form. In 1930 we identify their work on hexuronic acid, which was later shown to be vitamin C; in 1937, the identification and derivation of the first structural formula for an adrenal hormone; and in 1940-44, the development of a method for the synthesis of dihydrocorticosterone.

It is significant that a Department of Biochemistry was established at The Mayo Foundation as early as 1914 and that the first problem was to identify the hormones of the thyroid gland. In December of that year thyroxine was isolated, thus permitting its chemical identification and also the first use of the hormone in clinical medicine. Striking results were obtained in the case of thyroid deficiency in children. Out of these studies grew a method for the determination of iodine in the blood and the first accurate determinations of this element in blood and tissue was published from the laboratory of the Department of Biochemistry of the Mayo Clinic.

In connection with the work on the chemical identification of the hormones, physiological investigations have been carried out by animal experimentation which have established the close relation between the crystalline hormones of the adrenal cortex and insulin. Thus the conclusion has been reached that the severity of the symptoms of diabetes depends not only on an absence of insulin but also on glyconeogenesis produced by the hormone of the adrenal cortex. The intimate relation between the lymphatic system and a hormone of the adrenal cortex has reached the point of disclosing a possible therapeutic application in clinical medicine of what is called "Compound E," when a sufficient quantity of it is at hand to permit investigations of leukemia and tumors of the lymphatic system.

In 1927 an investigation was undertaken in the field of sulfhydryl compounds. A method to determine the glutathione was investigated. This led in 1927 to the isolation of glutathione in crystalline form and the report of this work at the Congress of Physiologists in Boston was the first announcement of the true chemical nature of this sulfhydryl- containing tripeptide. This was followed by the determination of the structure of glutathione.

I have mentioned the work of 1930 on hexuronic acid. In 1932 it was found by further study with larger quantities that hexuronic acid was in fact vitamin C. The first crystalline compounds of the hormone or hormones of the adrenal cortex (from which vitamin C had been derived), were isolated in 1933-34. This permitted the development of the first structural formula for such hormones and the publication of the results in May, 1937. The chemical investigation of the adrenal cortex that has been carried on since that time has yielded the isolation of the hormones designated A, B, E, and F, and the so-called amorphous fraction.

Because of the experimental results obtained with these crystalline hormones, it became desirable at the outbreak of the war to make them available for investigation both in clinical medicine and for the Medical Corps of the Army. In 1940 attempts to prepare these hormones synthetically were begun and in 1944 work was completed on a method which provided a pathway for the synthesis of the simplest one of the hormones designated Compound A.

During the past ten years the Mayo Clinic has steadily developed its interest in chemotherapeutic and antibiotic agents. You are familiar with vaccination against smallpox which provides a means of stimulating the development of protective antibodies against this disease. You are also familiar with the extension of the principle in the successful protection against certain other diseases. Thus the physician prevents infection or terminates infection. What is being done in such instances is to store up ammunition for each individual's internal war. The most exact knowledge of physiological processes by quantitative and qualitative analysis is required for medical practise in this field, and so too there is required the manufacture of standard drugs whose effects have been precisely determined under given conditions.

Thus the physician (and his laboratory allies) aids nature in keeping us well or in restoring the normal balance of functions once we become ill. He must weigh carefully and control as rigidly as he can, prescribe accurately, apply conservatively and explore relentlessly and courageously, in order to make use in full panoply of the multiform tools, processes, and products, that science now provides. Among the Mayo studies of chemotherapeutic agents I have time merely to add only a word on the valuable work of the tissue-culture laboratory and of progressive studies on gramicidin, penicillin and streptomycin. Experimental studies on the chemotherapy of tuberculosis should also be mentioned, studies that are both experimental and clinical in nature.

In these all too brief references to the technical aspects of the work of the Mayo Clinic we see illustrated again and again the attainment of purposes that were in view when the Mayo Clinic was organized and that have been restated in the establishment of The Mayo Foundation and the working out of the conditions under which The Mayo Foundation became the property of the University of Minnesota. Under a strikingly liberal agreement, medical education and research are given a degree of support in the laboratories at Rochester that fulfills the aim of the Mayo brothers to act as "trustee of the sick man's money" and to transfer from private hands to a public institution the responsibility for the care of funds and for the maintenance of the conditions of freedom and stimulation that brought the Mayo Clinic in the first instance to a position of world renown.

The importance of a great foundation established under such liberal conditions cannot be overestimated in this time of growing social complexity and public control. Consider the single effect of the liberation of energies of investigative minds in such an environment. I have spoken of the internal environment of the body. There is a corresponding *internal environment of the mind.* From thousands of examples we learn of the special difficulty involved in conducting research when the investigator tries also to make a living through practise. It is to the credit of the medical profession that these two things are joined in so many thousands of instances and that literally scores of the distinguished names in American medicine are those of men who had first to make a living, and after that to consider how they might advance knowledge of the diseases for whose control or amelioration they shared the responsibility.

I mention Dr. Welch in this connection because he was a great friend of the Mayo Clinic and because his long experience illustrates the point that I am trying to make. After thorough preparation abroad, he was obliged to begin the practise of medicine in order to make an independent living and it was in the beginning of this effort that he was identified by Dr. Billings as a man with a most unusual mind and character. His appointment by President Gilman at Johns Hopkins followed soon thereafter and he became free under the best possible internal environment of the mind to pursue the fundamental studies for which he had been so well prepared.

The example and the testimony of many earlier physicians are before us. One of the earliest in America is that of John Morgan. After excellent preparation for the times, he directed his attention to the shortcomings of medicine in America. His discourse of May, 1765, at the Commencement Exercises of the College of Philadelphia is a classic and his address to the trustees of the College contains a paragraph which I wish to quote.

> Where abilities and the love of a profession unite, there is the surest presage of success. But unhappy is the Physician, who has a soul turned to philosophical inquiries, who loves to search into the causes, and investigate the phenomena of diseases; and yet is at the same time diverted from these useful researches, by other occupations to which he has an aversion. . . .*

It is in the line of a great tradition, therefore, that growing facilities are required if specialization is to play its crucial role in the advancement of knowledge that ultimately can be brought to the relief or defense of a suffering patient. At the close of the first World War, conscious of our dependence upon the great schools of Europe, a few of our leading foundations intensified and amplified their support of institutions engaged in pioneer investigation. Through the National Research Council and through leading universities the means were provided for first-class advanced education in the fundamental sciences no less than in medicine. It was not the intention to break the connection with Europe but to lessen our dependence upon Europe, or, better said, to elevate the standards of medical education and research in America. Only such a program was considered worthy of our great power and our still greater potentialities and responsibilities.

The total effort proved to be one of the most statesmanlike in the intellectual history of America: it foresaw, it foreplanned, it drove with steady insistence toward its objectives, and it succeeded. When we entered World War II in 1941, every family in America had a degree of re-assurance that was not possessed in 1917 when we entered World War I. Tens of thousands, and perhaps hundreds of thousands of lives have been saved in the armed forces through the discoveries and the intensified developments that took place between the two world wars.

I mention these things in connection with the achievements and bright prospects of the Mayo Clinic because the members of the Mayo staff have played a signal part in the whole national development. The founders of the Mayo enterprises no less than the staffs, under the stimulus of a great humanitarian impulse and with unrivalled statesmanship, have been fortunate agencies of human betterment in the field of medicine. To all who have aided in any way in the magnificent achievements that we honor today, we express our gratitude, our felicitation, and our faith that they will continue to be guided by the same star. Vigorous explorers, their campfires have been lighted on many a peak. Their advance to the lofty heights of endeavor has been steady. By their discoveries they have stimulated all of us who work in the vast field of cooperative research and in the meantime by their generous spirit they have made us their perpetual friends.

**A Discourse Upon the Institution of Medical Schools in America,* by John Morgan, p. 43. Reprinted from the first edition, Philadelphia, 1765. Baltimore: The Johns Hopkins Press, 1937.

MEET OUR CONTRIBUTORS

(Continued from page 70)

Dr. Shields Warren is assistant professor of Pathology at Harvard University Medical School and pathologist at New England Deaconess Hospital; graduate of Boston University, 1918, (A.B.), Harvard University Medical School, 1923, (M.D.); member, American Association Cancer Research, American Association Pathology and Bacteriology, American Society for Experimental Pathology, Society for Experimental Biology and Medicine, and American Association for Advancement of Science.

Dr. Harry A. Wilmer is a Fellow in Medicine, Mayo Foundation; graduate of University of Minnesota, 1938, (B.S.), 1940, (M.B.), 1941, (M.D., M.S. in Anatomy), 1944, (Ph.D. in Pathology); Fellow, National Research Council, Johns Hopkins University, 1944-45; awarded the Rollin E. Cutts Prize in Surgery, University of Minnesota, 1940; author of *Huber the Tuber* and *Corky the Killer.*

Dr. Andrew Yeomans is associate professor of Preventive Medicine, Johns Hopkins University School of Medicine; graduate of Harvard Medical School, 1935, (M.D.), (Research Fellow); certified by American Board of Internal Medicine; Associate, American College of Physicians; member, Massachusetts Medical Society, American Federation for Clinical Research; naval member, U. S. A. Typhus Commission, War Department, Washington, D. C., 1942-46.

Eras in Medical History

Donald C. Balfour, M.D.*

Rochester, Minnesota

May I first express to the American Pharmaceutical Manufacturers' Association, and to the committee which recommended this award to the Mayo Foundation, the deep gratitude of the men and women who compose the faculty of that Foundation. I can assure you that we are sensitive of the high honor which accompanies the invitation to us to join that company of distinguished individuals and organizations previously the recipients of this award. Moreover, to have had the presentation so graciously made by Dr. Isaiah Bowman, President of Johns Hopkins University, is a distinction which we will always prize. It is, therefore, a privilege for me to accept this award on behalf of the faculty and fellows of the Mayo Foundation of the University of Minnesota, and particularly in the name of those members of the faculty and of the staff of the Mayo Clinic who, through their research, practice, and teaching, in various fields of medicine, of surgery and of the medical sciences, have brought this recognition to the Clinic and Foundation.

A cursory review of medicine today immediately makes evident the phenomenal advances which are currently taking place. These advances are of such significance to the future of mankind that a new era in medicine is in the making. Although the initial impulse in the progress that has been effected has come from basic medical sciences, it is true today, as it always has been true through the history of medicine, that the objectives of medical research have been realized in the realms of medical practice and medical education. If I may be permitted to speak for the medical profession as a whole, it is a pleasure to acknowledge here the debt to those pharmaceutical organizations which have pursued the same objective as has medicine, namely the benefit of mankind.

The evolution of medicine through past centuries has brought to twentieth century medicine wonderful achievements in the cure and prevention of disease. It is important, therefore, to examine the trends in medical history by which these achievements have been attained and from such study to outline a course which will offer the greatest promise for medicine, and so for mankind, in the future. These trends in medicine make clear that the whole structure of medicine today rests upon the early foundation laid by those pioneers whose work has given them a permanent place in medical history.

In the present era of medicine, organized medical research already has brought about such remarkable advances in medical education and practice that no problem of medicine seems unsolvable. It is necessary to consider for only a moment the recent developments in aviation physiology, chemotherapy, radioactive isotopes and the identification, extraction and synthesis of organic compounds to realize that unlimited possibilities for the control and elimination of many of the diseases of humanity are possible of attainment.

It is obvious not only that the trend of medicine through the centuries has been toward preventive measures but that, in the westward march of civilization, America has become, to borrow from Tennyson, the "heir of all the ages in the foremost files of time." Obvious is it, too, with the warring nations so lacking in facilities for medical education, medical practice and medical research, the world will look to America to supply deficiencies in these fields. America, therefore, occupies a commanding place in medicine today, and in the fulfillment of its obligations because of this, the capacity of our people for organized effort will prove a tremendous asset. This capacity for working together accounts for the development of the great medical schools, hospitals, medical centers and research institutions in this country. The pharmaceutical manufacturers have employed their facilities for medical research in the development of therapeutic preparations and then have enlisted the collaboration of the medical profession in trial applications of these preparations before offering them as products of known clinical efficacy. This has been a highly significant development of modern medicine and justifies the faith that American medicine can and will lead the way to greater achievements in the future.

The Mayo Foundation receives this award with humility but with a gratification that the objectives set by the Doctors Mayo and the Board of Regents of the University of Minnesota thirty years ago, when the Foundation was established, have been shown to be sound in the past and the present; we cannot help but hope that the aims of the founders can remain essentially unchanged in the future. Certainly a humanitarian philosophy has been inherent in the research and teaching of the Mayo Foundation, as well as in its other activities where these have related to medical practice. If any of this philosophy can be put into words, it is embodied in the phrase which Dr. W. J. Mayo kept as a guiding light throughout his life, namely: "He loved the truth and sought to know it."

Abstract of acceptance address delivered at the time of presentation to the Mayo Foundation of the American Pharmaceutical Manufacturers' Association's Annual Award, New York, December 9, 1946.

*Director of The Mayo Foundation.

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Editorials

CHEMOTHERAPY

In an address entitled, "The Usefulness of Useless Knowledge," delivered at the dedication of the Squibb Research Laboratories, the distinguished scholar, Dr. Abraham Flexner, said: "I shall speak to you for a few moments on a few aspects of irrationalism, for surely it is an irrational fact that so often happens that the ceaseless quest for the useless should—sometimes soon and sometimes later—result in conferring some great practical boon upon harassed and floundering mankind . . . Institutions of learning and institutions of research should be devoted to the cultivation of curiosity and the less they are deflected by considerations of immediacy of application, the more likely they are not only to contribute to human welfare, but to the equally important satisfaction of intellectual interest . . . "

Is this not a fascinating vision of Sir Alexander Fleming's contribution to mankind and the intellectual atmosphere in which he worked? Fleming has said that penicillin was found by accident for he first noticed it while "playing with a culture of staphylococcus, doing nothing very important." Fleming's description of penicillin in 1929 was not the beginning of chemotherapy; it was not even the first description of the inhibition of bacterial growth by penicillium, for John Tyndall had commented on this before the Royal Society in 1876. Fleming's curiosity and his pursuit of an interesting observation was like that of Galileo, Bacon, and Sir Isaac Newton.

The horizon of chemotherapy—the sulfonamides and the antibiotics—seems infinite. While penicillin has supplanted the sulfonamides in many infections, it has not done so in all. In particular, sulfonamides are the drugs of choice for most patients with urinary tract infections, wound infections, peritonitis and meningitis. And now streptomycin. The cautious and successful study of the effect of streptomycin on experimental and certain clinical forms of tuberculosis can serve as a classical example of the evaluation of a new chemotherapeutic agent.

To a large measure, humanity is indebted to the concerted and gigantic programs of many pharmaceutical houses. These programs were often great gambles, at first stimulated by needs of the armed forces. Investigators in universities are performing indispensable tasks in tracking down new chemotherapeutic agents.

Some men are hard at work on problems of no immediate application—to satisfy their curiosity and intellectual interest: the microbiologist, the chemist, the physicist, the pharmacologist and the clinicians.

The successful use of antibiotics depends on the clinician's ability to select for treatment those conditions most likely to respond. When therapy is indicated, it is to be adequately administered; when it is not indicated, the doctor should not be a chemotherapeutic dilettante. He must be alert for the possibility that normally sensitive organisms may be initially resistant to unusually high concentrations of the drug, and he must be on the lookout for the development of drug-fastness and hypersensitivity reactions.

The doctor in practice has been given agents which can forestall and defeat pathogenic organisms causing fatal diseases, but it is of almost equal importance that he can now relieve the suffering and shorten the course of many nonfatal illnesses. As the number of agents with varied therapeutic and pharmacologic actions become available, then the choice of an agent becomes more difficult and the treatment of infectious diseases becomes more complicated as the treatment becomes more successful.

HARRY A. WILMER, M.D.

PERSONALITY IN MEDICINE

In Eric Sevareid's recent book *Not So Wild a Dream,* we find this mention of the family physicians in his native town at Velva, North Dakota: "When Duff Aaker died prematurely, why did the whole town mourn his death with such unfeigned sorrow? He was only a country doctor with no wealth, no lineage, no power over them but the power of his personality." A nice example of a well rounded question with a descriptive answer.

Personality is a wonderful thing. Everyone possesses this attribute in some form because, in a broad sense, it is the sum total of one's qualities of body, mind, and character that distinguishes one individual from another. We are all alike in that we are all different. Many physicians with high scholastic attainments fail to receive the confidence and appreciation due them because their personalities do not suit their environments. It is only natural to assume that the handsome, hale-fellow-well-met should be popular wherever he goes but there are localities, strange to say, where he might not fit into the picture at all. We recall a physician located in a small Wisconsin town during the old horse-and-buggy days who had a lineage of hard working Scotch forebears transplanted in the rugged soil of Vermont. He was small of stature, had an impediment of speech that manifested itself in most embarrassing form at unpredictable moments in stammer and falsetto. He worked hard; day and night he hitched up his own horses and drove great distances over muddy and corduroy roads to relieve pain and constipation. He was unquestionably sincere but the preliminary ceremony to a consultation was sometimes amusing. In cases of pain his pocket knife would carefully deposit about three grains of Dover's Powder on each of the papers previously arranged on the table and then "to overcome its constipating action" a little podophyllin was added. In case of constipation his favorite remedy was podophyllin and he dished that out first, then "to overcome its griping effects" added a little Dover's Powder. We have enumerated handicaps only to show that these may be eclipsed by devotion to duty, sympathetic understanding, and adaptability to the patients' needs. He may not have had the personal charm and entertaining qualities of the country doctor at Velva but we would be inclined to wager that the funeral cortege was fully as impressive and equally as significant of his power of personality.

A. E. H.

MINNESOTA MEDICAL FACULTY COLLABORATION IN HEALTH EDUCATION FILMS

There is a new technique in health education, which will utilize specially prepared films for supplementing a popular textbook used in college freshman hygiene courses and adult education groups. It consists of a series of seven 16 mm. sound motion pictures and a like number of coordinated silent filmstrips on vital health subjects. These are desgned to correlate with and supplement the subject matter of *Textbook of Healthful Living,* by Dr. Harold S. Diehl, Dean of the Medical Sciences, University of Minnesota, one of the Board of Editors of the Journal-Lancet. They will be ready for distribution some time next spring. Instructors' manuals will also be provided, with suggestions on making effective, integrated use of these teaching materials.

Collaborating with Dr. Diehl in providing technical assistance in this film program are Dr. William A. O'Brien, Director of Postgraduate Medical Education, Dr. Ruth E. Boynton, Director of Students' Health Service, and Dr. Ruth E. Grout, Professor of Public Health and Education, all of University of Minnesota. The films are being produced under the direction of Albert J. Rosenberg, Manager of the recently created Text-Film Department of McGraw-Hill Book Company, Inc., of New York City.

Selection of film subjects has been directed to those parts of the course most difficult for the student to understand, as determined from replies to a questionnaire sent to users of the text, and to those parts of the book that can be more effectively presented in the visual medium. The films will employ the same approach to the subject and the same terminology as the book, but will go beyond the book treatment by presenting additional information and taking advantage of the inherent expository capacities of the film medium.

Subjects of the seven motion pictures are: Body Care and Grooming; Personal Health; Care of the Ears, Nose and Throat; Group and Public Health; Immunization and Vaccination; Sex Education; and Mental Hygiene. Presentation in the films is entirely factual, with no attempt to plead any cause, point any moral or promote any health fad. The aim of the films is simply to extend the coverage of the textbook in setting forth the more significant available information concerning the preservation and improvement of health.

Each motion picture will be accompanied by a coordinated silent filmstrip, or slide film as they are sometimes called. However, the motion pictures and filmstrips are each designed to be functionally different. The motion pictures provide realistic explanation of fundamental health precepts, and dramatize recommended procedures for good health maintenance. Wherever it seems desirable for better understanding of body functions and the processes of health protection, the motion pictures utilize animated drawings and photomicrography. Thus motion pictures will help the student to visualize what is normally difficult or impossible to see.

Each filmstrip is being planned as a follow-up to the corresponding motion picture. The filmstrip presents additional factual material, asks questions, and re-emphasizes key points in both textbook and motion picture. This type of film is valuable for class review, for oral discussion or examination, for lecture illustration, or for study by small groups or even by individuals out of class.

This series of motion pictures and filmstrips is among the first of a number being produced to supplement widely used textbooks. The Text-Films on health education are being produced by Audio Productions, Inc., New York City.

WHO OWNS THE FILMS?

American College of Radiology Supplies the Answers.

The American College of Radiology has adopted the following statement of policy regarding ownership of radiograms for the guidance of hospitals and physicians.

1. Roentgenograms should be used for the best interest of the patient.

2. The roentgenograms are the legal property of the radiologist or of the hospital in which they were made.

3. The radiologist should make the films available for inspection by the physician who referred the patient for X-ray examination, along with a copy of the report of the radiologist.

4. If the referring physician, or if the patient in behalf of the referring physician, takes the films away from the office or the hospital, it should be clearly understood that the films are "on loan" and should be returned.

5. If the patient dismisses the referring physician and goes to another physician, the films and the report should be made as freely available to the second as they are to the first physician who originally referred the patient.

6. If the referring physician objects to the submission of the films to the second physician or to giving to the latter a copy of the radiologist's report, the radiologist is obligated to do so in spite of this objection.

7. All films should be legibly and permanently marked so that the patient can be identified and the date on which they were taken can be determined. This is important because, under some conditions, a comparison of films just made with others made previously may be the crucial factor necessary to establish a diagnosis or to estimate the progress or regression of a disease.

8. When a medico-legal situation exists, the radiologist has a right to refuse the involved films if necessary for his own protection, except on a court order.

9. A liberal attitude regarding the release of films is more desirable than strict insistence on one's legal rights, in order not to engender the enmity of a patient or of a physician by strict adherence to the rule.

10. In recognition of the universal importance of radiologic methods of examination, the principles outlined regarding the use of roentgenograms are deemed by the American College of Radiology to be equally applicable to roentgenograms made by physicians other than those who are specialists in radiology.—(From *The Modern Hospital,* October, 1946.)

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

NOVEMBER 8, 1946

(October Examination)

Name	*School*	*Address*
Alcorn, William John	U. of Minn., M.B. 1943, M.D. 1943	5829 Pleasant Ave., Minneapolis, Minn.
Ashe, William McClellan	U. of Rochester, M.D. 1943	Mayo Clinic, Rochester, Minn.
Barber, Tracy Ezra, Jr.	Temple U., M.D. 1943	802 Park Ave., Austin, Minn.
Berris, Barnet	U. of Toronto, M.D. 1944	Box 45, University Hospital, Minneapolis, Minn.
Brooker, Warren Jay	U. of Iowa, M.D. 1945	St. Luke's Hospital, Duluth, Minn.
Brooks, Lowell M.	U. of Louisville, M.D. 1943	Mayo Clinic, Rochester, Minn.
Cardy, James de Vic	U. of Alberta, M.D. 1940	Dept. of Pathology, U. of Minn., Mpls., Minn.
Carter, James Wm. Jr.	U. of Texas, M.D. 1940	Mayo Clinic, Rochester, Minn.
Chisholm, Tague Clement	Harvard U., M.D. 1940	308 Phys. & Surg. Bldg., Minneapolis, Minn.
Connery, David Bradford	U. of Pa., M.D. 1932	Mayo Clinic, Rochester, Minn.
Cunningham, Ernest Samuel, Jr.	U. of Texas, M.D. 1941	Mayo Clinic, Rochester, Minn.
Eckles, Nylene Elvira	U. of Minn., M.B. 1945, M.D. 1946	318 Harvard S. E., Minneapolis, Minn.
Ekstrand, Leroy Magnus	U. of Ill., M.D. 1943	108 E. 2nd St., Wabasha, Minn.
Foster, Orley Walter	U. of Minn., M.B. 1943, M.D. 1943	1149 Med. Arts Bldg., Minneapolis 2, Minn.
Friden, Frank Joseph	U. of Minn., M.B. 1943, M.D. 1943	1705 St. Clair Ave., St. Paul 5, Minn.
Gay, James Rowland	Johns Hopkins, M.D. 1939	Mayo Clinic, Rochester, Minn.
Gentling, Allen Archibald	Louisiana U., M.D. 1942	Mayo Clinic, Rochester, Minn.
Halliday, Phillip Vernon	U. of Minn., M.B. 1945, M.D. 1946	518 No. 12th St., Virginia, Minn.
Hasskarl, Walter Frederick, Jr.	U. of Texas, M.D. 1942	Mayo Clinic, Rochester, Minn.
Headley, Nathan Edwin	Ohio U., M.D. 1941	Mayo Clinic, Rochester, Minn.
Hightower, Nicholas Carr, Jr.	U. of Texas, M.D. 1944	Mayo Clinic, Rochester, Minn.
Hoskins, James Howard	U. of Ill., M.D. 1924	5408 Elliott Ave. So., Minneapolis, Minn.
Koff, Sheldon	U. of Minn., M.B. 1937, M.D. 1938	2214 - 4th Ave. No., Minneapolis 5, Minn.
Korum, Lyle W.	U. of Minn., M.B. 1943, M.D. 1944	5432 Bryant Ave. So., Minneapolis, Minn.
Kuiper, Klaire Van Zanten	Rush Med. College, M.D. 1942	Vet. Adm. Hosp. N.P. Staff, Mpls. 6, Minn.
Landry, Rudolph Matas	Tulane U., M.D. 1942	Mayo Clinic, Rochester, Minn.
Lerner, Abraham Ross	U. of Manitoba, M.D. 1932	3755 Joppa Ave., St. Louis Park, Mpls., Minn.
Luellen, Thomas Joseph	U. of Kansas, M.D. 1941	Mayo Clinic, Rochester, Minn.
McLaughlin, Blaine Edmund	U. of Syracuse, M.D. 1942	453 Winona St., Winona, Minn.
Munson, Martin Sigfred	U. of Minn., M.B. 1946	St. Luke's Hosp., Duluth, Minn.
Pratt, William Coleman	Washington U., M.D. 1938	Mayo Clinic, Rochester, Minn.
Ramsey, William Horn II	Temple U., M.D. 1941	Mayo Clinic, Rochester, Minn.
Ruff, Curtis Cleaver	U. of Pennsylvania, M.D. 1941	Mayo Clinic, Rochester, Minn.
Seiler, Hawley Howard	Med. Coll. of Va., M.D. 1937	Mayo Clinic, Rochester, Minn.
Siedenburg, Richard Henry	St. Louis U., M.D. 1943	Mayo Clinic, Rochester, Minn.
Siegel, Sheldon Colman	U. of Minn., M.B. 1945	2154 Randolph, St. Paul, Minn.
Skoog-Smith, Anton William	U. of Minn., M.B. 1943, M.D. 1943	3518 Nicollet Ave., Minneapolis 8, Minn.
Smith, Marie Anne	U. of Ill., M.D. 1943	Glenwood Hospital, Minneapolis, Minn.
Stark, David Berkeley	U. of Toronto, M.D. 1943	Mayo Clinic, Rochester, Minn.
Stauffer, Maurice Havelyn	U. of Kansas, M.D. 1941	Mayo Clinic, Rochester, Minn.
Van Patter, Ward	U. of Western Ontario, M.D. 1944	Mayo Clinic, Rochester, Minn.
Warren, Ward B.	Indiana U., M.D. 1939	Mayo Clinic, Rochester, Minn.
Wenzel, Ralph Erhart	Northwestern, M.B. 1937, M.D. 1938	Albert Lea, Minn.
Whitesell, Frank Bean, Jr.	Georgetown U., M.D. 1941	Mayo Clinic, Rochester, Minn.
Zieve, Leslie	U. of Minn., M.B. 1943, M.D. 1943	317 S. E. 4th St., Minneapolis, Minn.

By Reciprocity

Adler, Bernard Charles	Washington U., M.D. 1937	1118 Lowry Med. Arts Bldg., St. Paul, Minn.
Angland, Thomas Anthony	U. of Minn., M.B. 1932, M.D. 1933	805 W. Yakima Ave., Yakima, Wash.
Anthony, Russell Albert	U. of Texas, M.D. 1938	U. of Minn. Med. School, Minneapolis, Minn.
Boylan, Richard Nelson	Northwestern, M.D., 1940	Mayo Clinic, Rochester, Minn.
Cullen, Richard Corbin	U. of Nebraska, M.D. 1940	2101 - 29th Ave. S., Minneapolis 6, Minn.
Detien, Edward Donald	U. of Wisconsin, M.D. 1943	Veterans Hosp., Bldg. 3, Minneapolis, Minn.
DeWeese, Wilford Joel	U. of Nebraska, M.D. 1940	Kings Co. Hosp., Brooklyn, N. Y.
Eckstam, Eugene Emanuel	U. of Wisconsin, M.D. 1943	Mayo Clinic, Rochester, Minn.
Forsythe, Robert Wallace	Tulane U., M.D. 1941	Mayo Clinic, Rochester, Minn.
Gates, Edward Martin	U. of Michigan, M.D. 1942	Mayo Clinic, Rochester, Minn.
Gramse, Arthur Edward	U. of Maryland, M.D. 1942	Mayo Clinic, Rochester, Minn.
Gross, John Burgess	Western Reserve U., M.D. 1945	Mayo Clinic, Rochester, Minn.
Hamilton, C. Ferrill	St. Louis U., M.D. 1940	Mayo Clinic, Rochester, Minn.
Heise, Philip von Rohr	U. of Arkansas, M.D. 1942	259 E. Broadway, Winona, Minn.
Johnson, Marcellus A., III	U. of Virginia, M.D. 1941	Mayo Clinic, Rochester, Minn.
Johnson, Richard Moltzen	U. of Nebraska, M.D. 1942	Slayton, Minn.
Johdahl, Willis Holder	Tulane U., M.D. 1941	Mayo Clinic, Rochester, Minn.
Kiefer, Edward Jern	Marquette U., M.D. 1941	Mayo Clinic, Rochester, Minn.
Lough, Roger Robert	Syracuse U., M.D. 1920	Winona, Minn.
Mabon, Robert Ford	Harvard U., M.D. 1938	Mayo Clinic, Rochester, Minn.
McCreight, Wm. George	U. of Oklahoma, M.D. 1940	Mayo Clinic, Rochester, Minn.
McGavic, John Samuel	U. of Iowa, M.D. 1934	c/o Mr. John D. M. Hamilton, Union League, Philadelphia, Pa.
Olcott, Eugene Diebold	U. of Louisville, M.D. 1943	Mayo Clinic, Rochester, Minn.
Olson, Oscar Charles	U. of Wisconsin, M.D. 1936	1305 - 12th Ave. N. E., Rochester, Minn.

Name	*School*	*Address*
Owen, Charles Archibald, Jr.	U. of Iowa, M.D. 1941	Mayo Clinic, Rochester, Minn.
Posey, Ernest Leonard, Jr.	Tulane U., M.D. 1944	Mayo Clinic, Rochester, Minn.
Ratke, Henry Victor	Jefferson Med. Coll., M.D. 1941	Mayo Clinic, Rochester, Minn.
Resch, Joseph Anthony	U. of Wisconsin, M.D. 1938	5248 - 46th Ave. S., Minneapolis, Minn.
Rudolph, Frank Alvin	U. of Vermont, M. D. 1943	805 W. 3rd St., Red Wing, Minn.
Sexton, Thomas Scott	U. of Maryland, M.D. 1939	Mayo Clinic, Rochester, Minn.
Short, Charles Augustus, Jr.	Northwestern, M.B. 1944, M.D. 1945	Mayo Clinic, Rochester, Minn.
Skouge, Oren Tenner	U. of Iowa, M.D. 1941	4416 Zenith Ave. No., Robbinsdale 12, Minn.
Van Herik, Martin	U. of Illinois, M.D. 1942	Mayo Clinic, Rochester, Minn.
Vollmer, Frederick John	Rush Med. Coll., M.D. 1933	172 Main St., Winona, Minn.
Washko, Peter John	U. of Pennsylvania, M.D. 1939	Mayo Clinic, Rochester, Minn.
Wendland, John Prentice	U. of Nebraska, M.D. 1941	215 Walnut St. S. E., Minneapolis, Minn.
	National Board Credentials	
Baggenstoss, Osmond Jacob	Rush Med. Coll., M.D. 1941	1404 - 27th Ave. N. E., Minneapolis, Minn.
Blackburn, Charles Marvin	Duke U., M.D. 1944	Mayo Clinic, Rochester, Minn.
Eger, Alban	U. of Buffalo, M.D. 1942	502 - 4th Ave. S. W., Rochester, Minn.
Felder, Davitt Alexander	Yale U., M.D. 1942	University Hosp., Minneapolis 14, Minn.
Goldsmith, Jos. Washington, Jr.	Long Island Coll., M.D., 1938	Emerson Clinic, E. 7th & Mounds Blvd., St. Paul 6, Minn.
Jensen, Edwin J.	Syracuse U., M.D. 1943	Mayo Clinic, Rochester, Minn.
Linner, John Henry	U. of Minn., M.B. 1943, M.D. 1943	4959 Colfax Ave. So., Minneapolis, Minn.
Mankey, James Charles	U. of Minn., M.B. 1943, M.D. 1943	530 So. Fairview, St. Paul, Minn.
Maschmeyer, Joseph Everett	Col. Med. Evang., M.D. 1942	525 - 16th Ave. S. E., Minneapolis 14, Minn.
McCready, Frederick Joseph	Tufts U., M.D. 1943	Mayo Clinic, Rochester, Minn.
McDowell, Richard E.	U. of Buffalo, M.D. 1943	Mayo Clinic, Rochester, Minn.
Morgan, Edward Henry	Northwestern, M.B. 1942, M.D. 1943	Mayo Clinic, Rochester, Minn.
Nix, James Thomas, Jr.	Louisiana State U., M.D. 1940	Mayo Clinic, Rochester, Minn.
Paschall, Jack, Jr.	U. of South. Calif., M.D. 1943	Mayo Clinic, Rochester, Minn.
Plass, Herbert Fitz Randolph	Harvard U., M.D. 1939	629 Med. Arts Bldg., Minneapolis, Minn.
Robinson, Cortland Otis	U. of Minn., M.B. 1939, M.D. 1940	156 E. 52nd St., New York 22, N. Y.
Scanlan, Robert Lawrence	Columbia U., M.D. 1942	Mayo Clinic, Rochester, Minn.
Smith, Robert Shaw	Geo. Washington U., M.D. 1943	Mayo Clinic, Rochester, Minn.
Taylor, Edmund Rhett	Johns Hopkins, M.D. 1941	Mayo Clinic, Rochester, Minn.
Wilder, Thomas Carroll	U. of Maryland, M.D. 1941	Mayo Clinic, Rochester, Minn.

Book Reviews

An Integrated Practice of Medicine—A complete general practice of medicine from differential diagnosis by presenting symptoms to specific management of the patient. By Harold Thomas Hyman, M.D. Four Volumes and Index. 1184 illustrations, pp. 4336. Philadelphia: W. B. Saunders Company, 1947. $50.00.

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There are some indications in teaching and publishing fields that the trend towards extremes of medical specialization has reached its peak. During the next decade, young doctors specializing in various branches of medicine may be forced into more general types of practice by the greater demand for the family physician. Dr. Harold T. Hyman and the W. B. Saunders Company must have had these men particularly in mind when they laid out the outline of this work. This set will appeal to general practitioners to whom it is dedicated, and to various types of specialists who require a ready reference to other fields.

Dr. Hyman is an internist in New York City, an Associate Professor of Pharmacology at Columbia University College of Physicians and Surgeons. He has gathered about him a group of well qualified New York men to collaborate in this ambitious program of integration of medical knowledge. There is no exact counterpart of their work in recent literature. These volumes occupy an intermediate position between single medical texts and the voluminous encyclopediae.

In the preface Dr. Hyman states the "four volumes and special index volume are arranged and coordinated to deal realistically with diagnostic and therapeutic problems of the individual patient. Cardinal objectives include: (1) complete delineation of the broad and diverse fields of general practice; (2) arrangement of material in the chronologic sequence of everyday practice; and (3) integration of the various subjects so that each discussion focuses consideration of the human patient as a biologic unity."

The sections are grouped somewhat heterodoxically under five headings: (1) Bodily injuries and bodily responses to injury. (2) Disturbances of the systems of communication and coordination. This section includes the circulatory and nervous systems, blood, and internal secretion. (3) Disturbances of end organ systems including digestive, respiratory, genito-urinary systems, etc. (4) The technics of medical diagnosis and therapy. (5) Prognosis.

Each section is prefaced by a brief discussion of the involved anatomy and physiology. Then follows the special methods of diagnosis and examination peculiar to the system or specialty concerned. The discussions of vairous diseases proceed along fairly common lines. An immense amount of labor has gone into the production of differential diagnostic tables illustrating many symptoms and signs. These tables alone are worthy of collection and separate publications. Wherever possible, individual signs and symptoms, especially symptoms that are presenting complaints, are isolated and the differential diagnosis is given in tabular form.

It is unfortunate that Dr. Hyman has seen fit to include some old illustrations of outmoded methods of surgical treatment. An example is the reduction of cervical spine dislocation shown being reduced by uncontrolled traction.

Since a set of this type is intended primarily as a work of reference, the index must be given much attention. In addition to the general index provided in a separate volume, each individual volume is carefully indexed. Thus the publishers have sought to facilitate the process of giving the answer to the question in mind.

Dr. Hyman may be guilty of oversimplification in attempting to integrate all of medicine as no text or series of numbered volumes could accomplish that. The work does force attention to the fact that there are many causes of bodily reactions. It may suggest a line of investigation to follow in the elucidation of obscure symptoms. This is an altogether new postwar general medical text and the material is abreast of the times although it is too soon to expect proper evaluation of the contributions of war medicine. The work of Dr. Hyman and his collaborators represents in its own way a swing of the pendulum away from specialization as it truly considers the patient as a whole.

R. B.

News Items

Dr. H. L. Lawder has been appointed University Health Officer for the Galesburg Undergraduate Division at Galesburg, Illinois.

Dean F. Smiley who served with the Navy in the Bureau of Preventive Medicine, Washington, D. C., is now Consultant in Health and Physical Fitness, American Medical Association. His office address is 535 North Dearborn Street, Chicago 10, Illinois.

Appointment of Dr. Victor Johnson of Chicago to the post of director of the Mayo Foundation for Medical Education and Research to succeed Dr. Donald C. Balfour when he retires from the directorship next October is announced by the Regents of the University of Minnesota and the officers of the Mayo Foundation.

Dr. F. H. Crago, specialist in internal medicine at the Great Falls clinic, Montana, has been elected to a fellowship in the American College of Physicians according to Dr. E. D. Hitchcock, governor for the college in Montana.

Dr. Harold E. McIntyre, Billings, Montana, was elected 1948 president of the Yellowstone Valley Medical society at the annual business meeting December 27. Other officers elected for 1947 are Dr. R. E. Smalley, secretary, Dr. John J. Hammerel, treasurer, and Dr. D. E. Hodges, member of the board of censors. Dr. John C. Powers will preside during this year. The society elects its president one year preceding the one in which he is scheduled to serve.

Dr. John A. Whittinghill, Helena, Montana, has been assigned to the staff of physicians and surgeons at the veterans administration hospital at Fort Harrison.

Dr. Clyde H. Frederickson, Missoula, Montana, has been selected as chief of the staff of Missoula Memorial hospital which opened January 1.

Newly elected officers of the Yankton District Medical Society are Dr. V. I. Lacey, Yankton, president; Dr. R. F. Hubner, Yankton, vice president; Dr. F. J. Abts, Yankton, secretary-treasurer. Drs. F. J. Abts, George E. Johnson, J. A. Hohf, all of Yankton, are new officers of the Board of Censors. The meeting was held December 18, 1946, at the Sacred Heart Hospital, Yankton, South Dakota. Dr. Bob Kreigstein, Sioux City, Iowa, spoke on "Shoulder Pain: Diagnosis and Treatment," and Mr. John C. Foster, Executive Secretary of the South Dakota State Medical Association, Sioux Falls, was a special guest.

Dr. Carl Baumgartner, Bismarck, was elected president of the sixth district of the North Dakota Medical association. Other officers are Dr. Harold Wheeler, Mandan, vice president, and Dr. T. W. Buckingham, Bismarck, secretary-treasurer.

Dr. S. B. Hocking, Devils Lake, North Dakota, was elected chairman of the permanent Ramsey county health planning committee at an organization meeting when plans were discussed for the establishment of a county or five-county health unit.

Dr. J. R. Dillard, Fargo, North Dakota, was elected persident of the Cass County Medical society for 1947. Other officers are Dr. B. M. Urenn, Fargo, vice president, and Dr. John H. Bond, Fargo, secretary-treasurer.

Dr. John D. Graham and Drs. John C. and Donald W. Fawcett became partners in establishing the Lake Region Clinic in Devils Lake, North Dakota, which opened January 1.

Thirty-seven South Dakota physicians attended the post graduate course on cancer at the University of Minnesota medical school continuation center January 2, 3, and 4, it was announced by officials of the South Dakota field army of the American Cancer society.

Recent appointment of Dr. J. A. Myers, professor of public health and medicine at the University of Minnesota, to positions in five major health groups concerned with the study and treatment of tuberculosis, was announced December 26, 1946, by Dr. H. S. Diehl, dean of the medical sciences at the University. Dr. Myers' appointments are as follows:

General chairman of the research council of the American College of Chest Physicians. Member of a committee of the National Tuberculosis association named at the request of General Omar Bradley, director of the Veterans Administration, to study the tuberculosis problem among veterans. Member of the newly established sub-committee on tuberculosis of the committee on medicine of the National Research council. This group will advise federal agencies such as the Army and Navy, the Veterans Administration and the United States Public Health service in a broad program of professional conduct and research in the field of tuberculosis. Member of a committee in the division of tuberculosis of the United States Public Health service to study methods of immunization against tuberculosis. Member of the tuberculosis therapy study section of the National Institute of Health. Appointed by Surgeon General Thomas Parran, this section will review all applications for grants in aid in the field of tuberculosis therapy and will make recommendations on these applications to the National Advisory Health council for action.

Re Medical Slyd-Rul enclosed in December issue of Ciba Symposia.

Due to manufacturers' error in placement of decimal point, conversion from 0.4 grain to gram is incorrect. It should read 0.025 gram, not 0.25. Please make correction by replacing present celluloid table with corrected temporary paper table now being mailed to you. Ciba regrets this error which causes you inconvenience, and will replace the temporary slide with a new celluloid table as soon as possible.

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Syr. Thiocol, q.s.........℥ vi 180 cc
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Syr. Thiocol, q.s.........℥ vi 180 cc
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*Reg. U. S. Pat. Off.

Deaths

Dr. Ralph E. Pray, 49, native North Dakotan and former Fargo physician, died December 18 in San Francisco, California.

Dr. Charles E. Remy, 65, superintendent of General hospital, Minneapolis, from 1930 to 1937, died December 16 in Chicago.

Dr. George C. Dittman, 60, eye, ear, nose, and throat specialist of St. Paul, Minnesota, died January 9. He was a World War I veteran and a member of the Ramsey County Medical society.

Dr. Julius O. Arntson, 58, veteran Bismarck, North Dakota, physician and a partner in the Quain and Ramstad clinic there, died the first part of January.

Dr. Frank W. Whitmore, 56, practicing physician in St. Paul, Minnesota, for 25 years, died December 4.

Dr. G. B. Cross, 68, physician and surgeon at Lakeville, Minnesota, for the past eight years, died during the first week of January.

Dr. Herbert A. Maillet, 69, pioneer eye, ear, nose, and throat specialist of Butte, Montana, died December 1 at the Mayo Clinic, Rochester.

Dr. H. G. Morgan, 63, physician and surgeon in Red Lodge and Roberts communities in Montana for the past 30 years, died November 25.

Dr. William W. Wolf, 35, Minneapolis, died December 14. He had practiced for seven years in Minneapolis and served in the medical corps during World War II.

Dr. John J. Ederer, 41, Minneapolis, who owned and operated the Mahnomen hospital before moving to Minneapolis in November, 1945, died December 11.

Dr. Eleanor J. Hill, 78, former Minneapolis school physician and member of the staff of Asbury and Northwestern hospitals, died December 12.

Classified Advertisements

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A 20 per cent reduction in the price of Oreton (testosterone propionate) has been announced by Schering Corporation of Bloomfield and Union, New Jersey, world's largest manufacturer of pure sex hormones. Recent clinical investigations have demonstrated that in addition to being specific for testosterone deficiencies in the male and effective in several gynecological entities, Oreton is of great value in the management of the metastasis of breast carcinoma. Through this reduction in the cost of Oreton ampules and vials, this hormone preparation is now available to many more patients in need of it.

WYETH'S "THERAPEUTIC AGENTS"

Wyeth Incorporated's handy new reference book for the busy doctor, *Therapeutic Agents of Special Merit*, is packed with factual information on the time-tested products of that company. It is designed to provide the physician with clear, concise and accurate information concerning a selected number of modern therapeutic agents which have proved to be helpful in routine practice to the general practitioner as well as the specialist. This listing supplies the doctor quickly with essential facts. The booklet does not include clinical and laboratory data but indicates they are available on request. Notable sections are on Purodigin, for congestive heart failure, Sopronol, for fungous infections, Soyola, for infantile eczema and antipertussis serum for early treatment of whooping cough. Lactamin, also covered in the booklet, indicated for the prevention and treatment of protein deficiency, came in for mention in the Quello paper published in the December 1946 issue of the Journal-Lancet.

CLINICAL EXPERIENCE IN USE OF PENICILLIN SUMMARIZED IN BOOKLET

NEW YORK — The first of a series of concise, ready-reference booklets, entitled "Penicillin Paragraphs," has been mailed to all active physicians in the United States by Schenley Laboratories, Inc., to help disseminate significant clinical experience in the use of this wartime-developed medicine.

A new edition will be issued each month, with each booklet devoted to clinical material bearing on the treatment of a specific disease, Dr. Charles E. Dutchess, medical director of the company, announced. The initial issue of "Penicillin Paragraphs" deals with use of penicillin in pneumonia. By filing each issue, physicians can build an indexed file of compact, authoritative reports on a wide list of diseases amenable to penicillin therapy.

Dr. Dutchess reported the company's monthly advertisements in leading medical journals will be synchronized in subject matter and timing with the month's edition of "Penicillin Paragraphs." A further informational service offered by the company is a comprehensive penicillin dosage chart available to all physicians who request it.

Sharp & Dohme Introduces Influenza Virus Vaccine

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Each Dalsol Capsule contains Vitamin D (as Calciferol), 50,000 U.S.P. units; Vitamin A, 5,000 U.S.P. units; C, 75 mg.; B_1, 3 mg.; B_2, 3 mg.; Pyridoxine, 0.33 mg.; Niacin, 15 mg.; Niacinamide, 15 mg.; Calc. Pantothenate, 3 mg.; E, 7.5 mg. A comprehensive brochure on Dalsol is available from the U. S. Vitamin Corporation, 250 East 43rd Street, New York.

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A new product, "Emulgen", developed by Lakeside Laboratories of Milwaukee, after extensive research cuts down the necessary injections to three or less a day. Emulgen is an injection vehicle consisting principally of sesame oil and cholesterin which easily emulsifies with aqueous solutions of penicillin and slows absorption of the drug after injection.

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CLOSING DATE MAY 15, 1947

The $34,000 prize contest for physicians' art work on the subject of "Courage and Devotion Beyond the Call of Duty" will be judged at the Atlantic City Centennial Session of the A.M.A. at Atlantic City June 9-13, 1947. Art works on other subjects may also be submitted for the regular cups and medals. For full information, write Dr. F. H. Redewill, Secretary, American Physicians Art Association, Flood Building, San Francisco, Calif., or to the sponsor, Mead Johnson & Company, Evansville 21, Indiana, U.S.A.

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Common Dermatologic Diseases

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Duluth, Minnesota

The skin, with its exposure to environmental trauma and with its physiologic and psychologic relationship to the organism, confronts the physician with visible evidence of disease. Yet, despite its outer position and easy accessibility, the skin often presents problems puzzling to the physician. We appreciate that the skin is not simple in its structure and function. It is always subject to influence from within and without. It is not a detached organ, but is in intimate relationship with the functions of other organs and tissue. Because the patient sees his skin, we must also be aware of his reaction to the disorder, his feelings and fears and the part that his emotion plays in the illness.

Classification of Skin Diseases

The purpose of this presentation is to discuss common dermatologic diseases; hence a working classification is necessary. The first disorders to be discussed will be the dermatitis group; second, urticaria and angioneurotic edema; third, the neurodermatoses; fourth, pyoderma; fifth, fungus infections, and the infestations of the skin; sixth, seborrhea, acne, pityriasis rosea, and psoriasis; and, seventh, tumors, both inflammatory and neoplastic, benign, precancerous, and malignant. Any classification of disease must be, by necessity, an oversimplification. In skin disorders, particularly, the disease is seldom a simple problem. We must always deal with both the action of the disease and the reaction of the patient toward his illness.

Dermatitis — Eczema

The dermatitis group of patients is most frequently met in general practice. Eczema as a term, although frequently misused, has a use and a place. Eczema may be an acute, subacute, or chronic inflammation. Erythema alone may be present. There may be isolated or grouped papules, vesicles or pustules upon a reddened, infiltrated base. Itching and burning sensations may be present; weeping and crusting on the one hand, or lichenification and scaling, on the other, may result. One can best think of eczema as an irritable skin without known cause. Nummular eczema is one of the common types. It is a localized, patchy variety, occurring chiefly on the extremities and particularly on the hands and forearms. The lesions are usually round, poorly defined, erythematous and vesicular patches of rapid development. They are often accompanied by itching and exudation. Eczema of the eyelids, the ears and the nape will be mentioned later in the discussion.

Contact Dermatitis

Contact dermatitis, probably the most common of the dermatitis group, implies by its name an eruption caused by substances to which the skin has been exposed. Its localization to an exposed site is a characteristic feature; hence the hands and face are most commonly involved. Other sites, in fact almost any area of the body, may be affected. Treatment may result in a contact dermatitis and these eruptions may become generalized. The lesions of a contact dermatitis, as in an eczema, may be acute, subacute, or chronic; usually the eruption is well localized to the site of exposure. Patch tests are helpful in reproducing the eruption for diagnostic purposes, but

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Presented at the 59th Annual Meeting of North Dakota State Medical Association in Bismarck, North Dakota.

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are not without danger. One must not be misled by the reaction of a primary irritant. The prime purpose of a patch test is to demonstrate epidermal hypersensitivity. Yet, occasionally when a positive reaction is found it may be only incidental and actually not the cause of the eruption.

ATOPIC DERMATITIS

Atopic dermatitis, in which the inflammatory process is primarily dermal, is but one phase of an allergic disorder. A predisposition of the patient toward hypersensitivity is present. The family history, if adequately elicited, reveals others with allergic conditions. Infantile eczema is usually the first evidence of an atopic individual and often, as a child approaches the age of 2 years, spontaneous remission will occur. In later childhood, sneezing, without the presence of upper respiratory infection, may indicate this inherited allergy. In the teens, the typical picture of atopic dermatitis usually arises. The face, neck, cubital, and popliteal spaces are characteristically involved. However, this eruption, too, may become generalized. The eruption is erythematous and papular in type and is usually dry; excoriation, the end product of severe itching, are often seen, and crusts tinged with blood are quite conspicuous. Exacerbations with the advent of cold weather in the fall and remissions during the summer months are commonly seen. Geographic change, accomplished by moving from a cold and moist climate to a sunny, warm, and dry section of the country can at times effect a rapid clearance of the eruption. The eruption of atopic dermatitis with its seasonal variation may persist for years. There is a tendency to clearance of the eruptions in the mid-twenties; however, most patients can be reassured that their ultimate recovery is to be expected.

Multiple hypersensitivity is the rule in the atopic individual. Dust, wool, and danders are among the most frequent sensitizers. Unfortunately scratch or intradermal tests are of little value and often fail to indicate clinical hypersensitivity. Negative reacting substances may actually cause exacerbations, while positive reactors may be innocuous on clinical exposures. Hypersensitivities, evident on skin testing, may change from year to year with removal of the sensitizing substance. Hayfever and asthma at times may be concomitantly present. Not infrequently, the dermatitis will be active while the asthma is quiescent and later the site of manifest hypersensitivity may be reversed.

TREATMENT OF ACUTE DERMATITIS: WET DRESSING

The treatment of any acute dermatitis is best accomplished by the dermatologic wet dressing. Gauze is preferred because of its absorbent properties. Although one of several solutions may be used, the technic, in the application of the wet dressing, is more important than the solution used. The gauze should always be dipped in the solution and then well wrung out to avoid excessive maceration of the skin. Thirty to forty layers of gauze have proved most practical in recent years during the acute nursing shortage. The dressing should be snugly applied. Remoistening every 3 hours is adequate.

The effectiveness of the wet dressing, the so-called dermatologic wet pack, is dependent primarily on: (1) The drainage which is accomplished and the reduction of edema thereb ybrought about; (2) the debridement of crusts, which would otherwise prevent close contact of the dressing with the affected skin. The more often the packs can be removed and remoistened, the more effective will be the drainage; (3) and, finally, the third accomplishment of a proper wet dressing is the relief that the patient gains from the distressing sensations of burning and itching. By this relief and by the fact that excoriations are prevented by the protective barrier which the dressing affords making the affected skin less accessible to his scratching hand or foot. The discomfort can be lessened and the period of illness appreciably shortened.

The solutions used in the application of the wet dressing are numerous. Darier's solution (copper sulfate in camphorated water) diluted either 1:16 or 1:32 with water, Burow's solution (aluminum subacetate) diluted 1:10 or 1:20 with water, or a 3 per cent boric acid solution are entirely satisfactory, and in the event that burning results from any one, a change to another is often effective therapy.

FURTHER TOPICAL THERAPY

Leiner's zinc lotion or calamine lotion are often quite adequate in a less extensive acute or subacute eruption. Either menthol or camphor in a ¼ to ½ per cent solution and phenol in a ½ to 1 per cent solution are effective antipruritics when added to these lotions. Lassar's zinc paste or Rosen's ointment (a softer paste) serve a good purpose when one desires to change from a wet dressing or lotion because of the excessive dryness which has developed. Boric acid ointment still deserves an honored place as a form of mild topical therapy. One can accomplish a great deal in the topical management of any dermatitis by the use of mild and soothing therapy. The addition of ichthyal or tar to lotions and pastes, although frequently effective in hastening the recovery, also carries with it the hazard of aggravating an already irritable skin. The use of soda, starch, or oatmeal baths should be mentioned as they are the least irritating way of removing the debris that accumulates on the skin. Mineral oil or olive oil likewise deserve mention as effective and non-irritant cleansing agents.

URTICARIA

Urticaria, including giant hives or angioneurotic edema, is commonly encountered in all medical practice. It has been estimated that about half of all individuals at some time during their lives have hives. In ordinary urticaria, both acute and chronic, the wheals may vary in color from dead white to pale yellow, pink or red, and in size from that of a pinhead to a palm or larger. Itching is usually present in varying degrees. The wheals may be few or many. The evanescent character of these lesions is, as a rule, a striking characteristic. The giant hives, or angioneurotic edema, usually involve the lips, the eyelids, hands, and feet, and at times the mouth, throat, and larynx. The edema of the larynx, when present, may cause death unless proper intervention is prompt. Adrenalin is specific in its effect on urticaria and when wheal-like lesions do not disappear after its administration, it is well to think of some condition other than urticaria, *e.g.*, the lesions of erythema multiforme.

Treatment of Urticaria

In the treatment of urticaria the use of adrenalin has already been mentioned. It is my experience that small doses of adrenalin, such as 2 or 3 minims given hypodermically, repeated every 10 to 15 minutes up to a total of 1 cubic centimeter if necessary, are most effective in the prompt relief of many cases. Benadryl* has recently become available in limited quantities and is of great help when administered in dosages of 50 milligrams three or four times a day. It has been a much welcomed adjunct in the management of urticaria, but it is to be remembered that it does not remove the cause of this condition.

A time-honored, though empirical treatment of great help is auto-hemotherapy, in which 10 to 20 cc. of blood, removed from the cubital vein and reinjected immediately deep into the buttock, is given every other day for up to two weeks' time. The combined use of crude liver extract, up to 5 cc. intramuscularly every day or every other day, and dilute hydrochloric acid by mouth in 15 to 20 minim dosage, given before each meal and in the middle of each meal, is well worth trial in some cases. Purging here is a valuable adjunct and elimination of suspected foods or drugs is indicated. Acute urticaria is usually easy to manage for it is a self-limited disease and subsides within a few hours to several days' time.

However, in cases of chronic urticaria, or those with angioneurotic edema, a very careful history is well worthwhile. One should try to correlate the eruption with drug ingestion, the presence of infection, and with emotional disturbances. Nervous exhaustion may be present and may precede many cases of intractable urticaria. Much relief has been accomplished in these patients by manipulation of their situation at home or at work. Phenobarbital sedation, limited to a few weeks' trial, has often stopped a vicious cycle and has thereby been of great help in the management of such cases. Adrenalin, Benadryl, auto-hemotherapy and other measures mentioned above have a place in the treatment of chronic urticaria as well as the acute.

Psychosomatic Skin Disorders

Any discussion of the neurodermatoses, the psychosomatic group of skin disorders, would probably provoke some disagreement of opinion among dermatologists and other practitioners of medicine. From a therapeutic point of view, I would define this group as skin disorders in which emotional disturbance plays a major etiologic role. In neurodermatoses an appreciation of the life situation of the patient is necessary. The physician must recognize where psychiatric help is needed and tide the patient over by sympathetic management until such consultation can be obtained. In most instances, he can allow the patient to obtain release from his emotional tension, correct misconceptions, give the patient insight when this is desirable, and, by manipulation, rearrange the environment in which the patient lives, or, at least by therapy, render the circumstance more tolerable.

Pruritus

Pruritus, in which no primary cutaneous lesion is evident or systemic disturbance present, *e.g.*, diabetes mellitus, and in which only excoriations indicate the disorder, is commonly encountered. Topical medication is of secondary importance and the time given by the physician to the patient in helping to solve an emotional problem will often afford great relief. Much help can be given to the cases previously mentioned of eczema of the eyelids, ear canals, and nape by this adjunct in treatment.

Neurodermatitis

The term neurodermatitis is used, sometimes as a blanket classification, for patients with whom the doctor cannot establish good rapport. In most instances it indicates an eruption, either localized or generalized, circumscribed or disseminate, in which psychic disturbance is the causal factor. Localization similar to that in atopic dermatitis, *e.g.*, involvement of the face, neck, cubital, and popliteal spaces, and the same type of an eruption is often present in these two conditions. The topical management of them should therefore be the same. However, the predisposition of the patient to allergic disease is absent in both the past and family histories of the patient with neurodermatitis.

Lichen simplex chronicus and circumscribed neurodermatitis, as terms, are frequently used interchangeably. Various sized patches, in which the skin is thickened and its normal lines exaggerated producing rectangular, papular areas, are present; the itching is usually intermittent and severe. Superficial X-ray and other topical therapy are of great help, but recurrences of the eruption are frequent if proper attention is not paid to the emotional background of the patient and supportive help given in this direction.

Self-Induced Eruptions

That self-induced eruptions are common is not surprising when one remembers that the skin is the most accessible organ to the patient. The patient may compensate for his problem or divert from his troubles by literally "taking it out on his own skin." Dermatitis factitia is a feigned eruption induced by the patient and characterized by variable types of lesions, from simple erythema to gangrene. It is usually produced by some caustic, other irritant, or instrument. The lesions, as one would expect, are commonly observed on portions of the body accessible to the hands. The outstanding clinical features are the sharp outline and the unusual, often fantastic, shape. The patient denies causation. His object is usually to excite sympathy or to escape feelings of guilt. On the other hand, neurotic excoriations are self-inflicted lesions of the skin in which deception is not an essential feature. The patient admits that he excoriates. These self-inflicted eruptions may have their beginning on a physical basis. The picking of the lesions of acne are a common story. The removal of superfluous hairs also provides a physical basis for this disorder. The habit of excoriating one's skin is fixed and often difficult to break. Neurotic excoriations may, in other instances, reflect a more serious underlying psychic disturbance. The patient may be obsessed with the idea that he is infested with insects which he must constantly dig out. In other patients, hostilities harbored towards, and the wish to destroy, others is turned to the destruction or the clawing of self. The physician can do much harm if he confronts this patient with inescapable evidence of guilt and does not leave some acceptable alternative in its place. Psychiatric management of such patients is indicated and is essential if adequate help is to be given. Local medications are certainly secondary in importance.

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*Beta-dimethylaminoethyl benzhydryl ether hydrochloride — Parke Davis and Company.

PYODERMA GROUP

The common infections of the skin in the pyoderma group are impetigo, ecthyma, folliculitis, furuncles, and carbuncles. The principal etiologic agents are staphylococci and streptococci. In these conditions the infection is primary. Some forms, particularly impetigo, are contagious and auto-inoculable. Individual susceptibility, dependent on factors which are not well understood, is important in determining the success of treatment. The occupational exposure to oils and greases, and the lack of cleanliness of the skin do much to increase the incidence and severity of the pyoderma.

IMPETIGO CONTAGIOSA; FOLLICULAR IMPETIGO; ECTHYMA

Impetigo contagiosa begins with a vesicle or bulla which ruptures, subsequently emitting at times a yellow, honey-like secretion which forms a brown crust, or which may become pustular and rupture forming a purulent crust with a dirty, eroded surface evident when the crust has been removed. The common sites are the face, hands, forearms, and legs. The lesions may be single or multiple. The course is usually acute, though if improperly treated may last for weeks. The lesions do not leave scars unless they have been excessively excoriated. Follicular involvement may predominate in these infections of the hairy regions, particularly the bearded area of the face and neck. In these instances, the term follicular impetigo or pustular folliculitis is used.

Calcium penicillin ointment, 5 per cent sulfathiazole ointment, or a combination of penicillin and sulfathiazole in an ointment base, offers quick and effective therapy in the treatment of impetigo. The sulfathiazole offers, however, a greater chance of a contact drug eruption through local sensitization. The follicular type of impetigo is more resistant to treatment. Instructions in the technique of shaving, with the use of the ointment immediately after, and, at times, desensitization to the causative micro-organism are important aids in both the treatment and prevention of recurrences of these follicular infections.

In ulcerative impetigo or ecthyma, the lesion extends beneath the true skin forming an ulcer which is covered with a thick, relatively adherent, dirty crust. When the crust is removed, purulent material is visible. The ulcer itself is often surrounded by an inflammatory, erythematous halo, painful to touch. Because of the depth of the involvement, scarring usually follows. Ecthymatous lesions occur most frequently at sites of trauma and scratching and are most commonly seen on the legs and arms. As in follicular impetigo, more than local treatment is needed. Desensitization to the causative germ is helpful and measures to improve the patient's general health may greatly facilitate recovery.

FURUNCLES AND CARBUNCLES

Furuncles are infections of one hair follicle, whereas carbuncles involve several. Furuncles and carbuncles may be single or multiple in number and may co-exist. Hairy sites are most commonly involved. Hospitalization is advisable if the danger areas of the face are involved. Effective in their treatment are superficial X-ray therapy, the local infiltration of the furuncle or carbuncle and surrounding area with penicillin solution, the oral administration of penicillin in sufficiently high dosage, or in cases of greater severity, hospitalization with intramuscular injection of penicillin. Hot, wet compresses often do much to relieve discomfort and facilitate drainage. When furuncles or carbuncles continue to develop, desensitization with staphylococcus toxoid is usually effective.

BACTERIAL INVASION OF SKIN

The terms infectious eczema or impetiginous dermatitis have recently come into greater usage with the recognition of the importance of bacterial invasion as a causal factor in skin disorders. An eruption of the hands or feet may develop from any of a number of causes. There may be a true contact dermatitis or a dermatomycosis. The skin may have suffered injury by mechanical or thermal trauma. Any one of these disturbances, together with the excessive use of soap and water, excessive perspiration due to vasomotor instability, menstruation and its increase in tissue hydration, the effect of hot or cold weather, may so lessen the resistance of the skin that bacteria, which, under ordinary circumstances would not be pathogenic, then invade the skin and the problem of infection or possibly a sensitization to some bacterial decomposition develops.

INTERTRIGO

Intertrigo is not uncommon, particularly in the obese, and is manifested by eroded, sharply outlined patches of eczema in the axillae and groins, in the folds of a pendulous abdomen, or on the neck and underneath the breasts. Intertrigo is a combination of the maceration following excessive heat and moisture and the entrance of bacteria, yeast, and fungi which invade and grow. The control of the heat and moisture is as much a part of the therapy as any bacterial, fungicidal, or astringent that one may choose to use. Where secondary bacterial infection has complicated and assumed the dominant role, in either a contact dermatitis, dermatomycosis of the hands or feet, and infectious eczema has resulted, or in intertrigo, penicillin ointment may be a definite aid in the more rapid control of the eruption.

INFECTIOUS ECZEMATOID DERMATITIS

Infectious eczematoid dermatitis, as its name would imply, is a weeping and crusted eruption, produced by staphylococci, in which an infected injury, resulting from insect bites or other trauma, mechanical, chemical, or thermal, sensitizes the adjacent skin and so produces a spreading eruption which may become extensive before it is checked. Hospitalization for this condition is usually necessary. The dermatologic wet pack is the most effective form of topical therapy. Removal of the original focus of infection, if still present, is essential. Infectious eczematoid dermatitis may run a protracted course despite all therapy. Ultraviolet light and superficial X-ray are useful adjuncts in all types of secondary infected eczemas.

Fungus Infections

Fungus infections and infestations, such as scabies and pediculosis, became a major problem in the recent war experience. The incidence of fungus infections varies greatly with the climatic conditions in which the patient lives. In the southern part of this country, fungus infections are always a problem. In the jungle theaters of the recent war, these infections kept many men from active battle duty and caused much disability. The maceration of the skin from excessive perspiration, and the lack of facilities for cleanliness so strongly predisposed the men to fungus infections that many could not be helped until they were moved to more temperate climates. During the summer season in this section of the country we see a striking increase in the incidence of dermatomycosis. The lesions may vary from mild scaling on the interdigital areas of the feet to fissuring of these webs, often complicated by secondary bacterial infection, in which single vesicles or vesicular patches are present along the sides and undersurface of the toes and on the soles, and, in some cases to more extensive eruptions in which large areas of the body surface may be affected with either a weeping and crusted eruption or widespread scaling, papular patches. Ointments or powders with proprionate—proprionic acid, or undecylenate—undecylenic acid, have given physicians specific and effective therapy for most fungus infections. The latter acid, now available to all practitioners in the form of Desenex ointment and powder, is of proven clinical value.

Ringworm (animal)

Two more types of dermatomycosis deserve your attention. Ringworm, acquired from animals, has been endemic in this area for years. It is most frequently seen in the rural population because of exposure to infected cattle. It is seen in truck drivers similarly exposed. Infected house pets, *e.g.*, kittens and puppies, may be responsible for these infections in urban areas. In the more severe cases, kerion may develop and present the appearance of a carbuncle. However, the infected tumor mass is not as acute and painful as that seen in a true carbuncle of the skin. In kerion a boggy, red mass studded with numerous pustula foci is seen. Salicylic acid and sulfur alone or combined in ointment bases, in sufficient strength to be both keratolytic and irritant, are effective in the treatment of these fungus infections.

Ringworm (human)

Epidemic ringworm of the scalp also deserves mention. It is a relatively new public health problem in the north central portion of this country. The causative fungus is human in type. The eruption is highly contagious and the infection affects the prepuberal segment of the population. The onset of this condition is usually insidious, with patches of lusterless hair first developing. The hairs loosen and fall and partial alopecia develops. The inflammation of the scalp affected is usually mild, with or without scaling. Occasionally, the inflammation may be considerable and even kerion develop. Although spontaneous remission is to be expected during puberty, with or without treatment, the extreme contagiousness of epidemic ringworm of the scalp and the potential disfigurement that could develop in our juvenile population are enough to warrant our full cooperation in the prevention of the disease process. Early detection on a large scale is possible by use of a so-called Wood light, in which ultraviolet light is filtered by nickel oxide. Infected scalps may be quickly screened by the striking greenish fluorescence of the affected hairs, well seen under this light. Inasmuch as ringworm of the scalp of the human type is a difficult therapeutic problem and often requires complete epilation of the scalp with X-ray, whereas ringworm of the scalp of the animal type is amenable to topical medications, it is necessary that cultural studies be performed with the use of Sabouraud's, or similar agar, to distinguish the human from the animal type. The local State Health Department will cooperate in these cultural studies. As already mentioned, the treatment of epidemic ringworm of the scalp, caused by the human strain of fungus, is a difficult problem before the age of puberty and usually requires complete, though temporary, epilation of the scalp with X-ray.

Infestations

Cutaneous infestations are of particular interest to the physician in war time and in postwar periods. The increased congestion of the population in civilian, as well as military, life has resulted in a sharp increase in the incidence of scabies. The role of pediculosis in the spread of serious epidemics is well known and will not be discussed.

Scabies

Scabies, on the other hand, is an infestation frequently seen by all physicians. It is infectious and is produced by a tiny spider-like insect, the *acarus scabiei.* The eruption is characterized by intense itching, which is increased when the body is warmed, either in bed or with exercise. Although the lesions are multiform, and secondary infection is often present, the most characteristic lesion is that of a burrow, a tiny channel just underneath the outermost epidermis, and in which the female acarus lays her eggs. The burrows are most easily seen in the webs between the fingers. The type of lesion varies with the area involved. On the hands, burrows, papules, and vesicles are commonly seen along with pyoderma of secondary infection. Excoriated papules are frequently seen on the flexors of the wrists and on the elbows. Papules and nodules may be present in the axillae and there may be eczematous lesions under the breasts; excoriated papules are easily seen on the abdomen, especially about the umbilicus, and on the lower back. Papules and nodules are often present on the penis and scrotum. The sites of predilection just mentioned are of great help in establishing the diagnosis. Similar infection of others in the family is quite suggestive. Demonstration of the acarus under a microscope in a specimen of tissue shaved from the epidermis of a burrow or papule will establish the diagnosis.

Sulfur ointment is still a highly successful, although unpleasant, form of treatment for scabies. Zylate* is likewise effective and much less offensive. The success of either treatment depends largely on the completeness of the application, *e.g.*, all body surface except the head, and the continuance of the therapy over a five- to seven-day period. Therapy carried out over shorter periods of time will often fail to eradicate the infestation and re-treatment will then be necessary. It is well to reassure the patient that the treatment can be curative is satisfactorily carried out and thereby prevent the occasional acarophobias which subsequently develop.

SEBORRHEA

Seborrhea, acne, pityriasis rosea and psoriasis are all well recognized disorders encountered in general practice. Seborrhea is a functional disorder manifested by an increase in the amount of the sebaceous secretion. Why sebaceous glands in some patients secrete more than normal is not definitely known. However, many related factors are present. In this climate seborrhea is much less common in the summer than in the winter months because of the influence of exposure to sun light. Decrease in bodily activity and curtailment of exercise, necessitated by illness requiring strict bed rest, will often precipitate excessive oil gland activity. Often with the restoration of normal activities, the patient's skin may show less evidence of seborrheic disorder. Overingestion of foods rich in fat or marked gains in weight may be trigger factors.

All such factors must be taken into consideration in the management of seborrhea. Salicylic acid, resorcin, or euresol, and sulfur are the active ingredients of choice in topical therapy. Oil vehicles are preferable for these substances, particularly in the dry type. However, salicylic acid and resorcin in alcohol, in seborrhea of the oily type, are most desirable from the patient's point of view. It must be emphasized that the therapeutic goal in the treatment of seborrhea is control of abnormal gland activity rather than cure, and it is well that the patient understands just what results he can expect.

ACNE VULGARIS

That acne vulgaris is a chronic inflammatory disorder involving the sebaceus glands is well known; that it is prone to spontaneous remission at the end of the puberal years is unfortunate, in so far as treatment is at times neglected or minimized, and little thought given to the cosmetic implication of the disorder to the patient or the permanent scars and disfigurement which may result from the more severe lesions. Some patients will develop acne vulgaris for the first time in their early twenties and they generally present a more difficult management problem. The face, chest, and back are the most common sites of involvement. Papules and pustules may predominate or the papules may form deep nodules, which at times undergo cystic degeneration. The latter type is usually the more difficult problem.

Avoidance of foods rich in fat, as in cases of seborrhea, is generally accepted as part of the therapeutic regimen. Resorcin and sulfur in lotions or paste are effective topical applications. Exposure to the sun or to ultraviolet light can be of great help and many patients with acne note the complete clearance of their skin by the end of the summer. Superficial X-ray therapy, given in fractional dosages, is in most cases the most satisfactory and effective treatment. Cleanliness of the skin, with the use of any mild soap, should always be suggested if it has not already been carried out. As a variant of acne, rosacea deserves brief mention. In many cases, the component of acne, such as that just discussed, predomintes. In others, the flushing tendency of the face is the main problem and leads to areas of redness and usually telangiectasis. In most cases, both the acne and rosacea components are present. With regard to the treatment of the latter, it should be added that anything that leads to the flushing of the face, be it a spicy food, coffee, tea, or alcoholic beverage, or an excessive emotional response, as in anger or embarrassment, should be avoided. Phenobarbital sedation may at times accomplish a great deal in helping such patients to control their blushing tendency.

PSORIASIS

Psoriasis with its characteristic reddish, rounded lesions, usually dry and covered with silvery imbricated scales is often more of a problem in therapy than in diagnosis. The scalp, elbows, knees, and sacral area of the back are the sites of predilection and are helpful in diagnosis. Other sites, however, may be involved and the eruption may be quite extensive. The increased whitening of the silvery scales when rubbed with a tongue blade or hard instrument is a useful aid. The disease affects persons of either sex and any age and is usually chronic, lasting a lifetime. Remissions with exposure to sunlight in the summertime are common.

Although the eruption of psoriasis is usually characteristic, in some cases it is difficult to distinguish from seborrheic dermatitis. The latter almost invariably commences on the scalp as "dandruff" and involves the "dandruff areas," *e.g.*, the face, particularly the forehead and nasolabial folds, the ears, and postauricular areas, the chest, shoulders, and upper back. The scales of seborrheic dermatitis are greasy and branny, and the axillae and other flexors or folded areas may be involved. In seborrheic dermatitis, there may be some tendency to ooze. Psoriasis, on the other hand, may be situated on the scalp as well, but, as a rule, the involvement is not so extensive and diffuse there and the lesions are more circumscribed. The white scales of psoriasis are not greasy and there is less tendency of psoriasis to ooze even in subacute and acute stages. There is no specific cure for psoriasis, as the cause is unknown. However, much can be done to improve and control the psoriatic skin, and the drug of choice is an ointment with ammoniated mercury, used in 10 to 20 per cent concentration on the scalp, and 3 to 5 per cent elsewhere. Paste with a 1 to 6 per cent crude coal tar, especially when combined with either exposure to sunlight or an ultraviolet light, is also highly effective.

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*Benzyl benzoate—33%—Upjohn.

PITYRIASIS ROSEA

Pityriasis rosea, another scaling eruption, which may require differentiation from some fungus infections of the trunk, from seborrheic dermatitis, squamous secondary syphilid, and acute psoriasis, is a self-limited eruption, asymmetrically distributed over the trunk and limbs. Seldom are the lesions below the knees or distal to the elbows. The lesions are yellowish, pinkish, or reddish scaling macules of various sizes and shapes, usually oval, in which the long axis of the lesions parallels the lines of cleavage of the skin. As a rule, an initial, large, single plaque precedes the general outbreak by one to two weeks and is often mistaken for ringworm. The so-called daughter lesions which subsequently appear resemble the mother plaque. All lesions are covered with a thin, white, branny scale. The patches may increase in size and the central portion tends to clear, giving rise to slightly elevated reddish rings with fawn colored centers.

Spontaneous disappearance of the eruption will take place in from six weeks to several months. Mild exfoliative ointments, containing salicylic acid, and peeling doses of ultraviolet light can shorten greatly the length of the attack. Patients should be warned to avoid hot baths which usually aggravate the eruption and result in itching. It is always well to advise the patient to take cool sponge baths for the duration of the eruption. It is a good rule to always take blood serologic tests for syphilis as one can then be sure that a secondary syphilid will never be missed.

NEOPLASMS

The interest and concern of both doctor and patient have been heightened in recent years by the constructive help and support of the American Cancer Society. Cancer of the skin stands high in its curability if detected in early stages. It is only natural that undue concern would at times be focused on the benign tumors as well as the malignant. A great deal of further research will be necessary before both types of growth are understood and further improvement in their curability is accomplished.

BENIGN NEW GROWTHS

Benign new growths may be the result of normal inflammatory processes or may be neoplastic. The common wart illustrates well the former and is generally considered to be infectious of viral origin. Verrucae plana juvenilis (juvenile flat warts), and verrucae acuminata (the so-called venereal warts) illustrate more clearly the nature of this infectious process than do the common warts. Local destruction of the wart by cautery is a satisfactory procedure. However, the great number of flat warts which may be present have led to the use of heavy metals such as bismuth subsalicylate in oil by intramuscular injection or mercury protiodide by oral administration, and this systemic type of therapy is often highly successful. A recent discovery that podophyllin, in a 25 per cent suspension of either mineral oil or an ointment base, is specific for the acuminate has added a simple and effective form of treatment.

Hypertrophic scars, arising from injury of the skin and possibly influenced by secondary infection, and keloids, arising without apparent cause, are other inflammatory tumors, benign in type, but resulting in disfigurement. If they are treated early with superficial X-ray their disappearance with minimal scarring can usually be expected. Pyogenic granulomas, which often appear to be the result of trauma and infection, may require biopsy and microscopic study of the stained tissue to differentiate them from malignant tumors. Nodular subepidermal fibroses occur as fibroma-like nodules situated usually on the legs, but may also develop on the forearms, trunk and other portions of the extremities. They begin as hard, shot-like nodules and gradually increase in size to that of a pea or slightly larger. The lesion attains its size and remains stationary. Surgical excision with microscopic study of the tissue will establish the diagnosis and effect a cure.

HEMANGIOMATA

Many neoplastic tumors are benign, and usually are dermal in their location. Hemangiomata of the strawberry type are common, those of the port-wine stain and cavernous types less common. Radiation with X-rays or radium causes effective regression of the strawberry type. Cautery with carbon dioxide snow is a useful adjunct. Plastic excision of the port-wine mark, if practical, is to be recommended. In many instances, however, the use of a covermark can effectively hide this discoloration and no destructive or surgical treatment will be needed. Injection with a sclerosing solution is most effective in the treatment of the cavernous hemangiomata.

MOLE

The common mole may be present at birth or develop later. It may be found on any surface of the body. The lesions vary in size and shape. They may be pigmented or non-pigmented, hairy or non-hairy, smooth or warty on their surface. Treatment is indicated if the mole begins to grow, changes in color or on its surface. Moles on sites of chronic irritation should be removed. Treatment, if indicated, should be by surgical excision or destruction with a cautery. The development of a malignant melanoma occurs with great rarity and treatment is of little avail.

PRE-CANCEROUS LESIONS

Common pre-cancerous lesions worthy of note are the keratoses, either senile or seborrheic in type, and leukoplakia. Although the latter is not cutaneous, it frequently involves the lower lip and so deserves consideration with the pre-cancerous skin disorders. Senile keratoses are often detected by the palpating finger as a rough patch before they are seen. Later they appear as greyish white, scaling areas. Leukoplakia appear as white, thickened areas on the mucous membranes of the lip, cheeks and tongue. Blood serologic tests should be done to exclude an underlying syphilitic infection in all cases of leukoplakia. Immediate destruction of the senile

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Orientation in Gynecologic Uterine Bleeding

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A LARGE part of any gynecologic practice is concerned with solving problems of uterine bleeding. Very often these problems are not settled satisfactorily from either the patient's or the physician's viewpoint owing to (1) too little attention to historical details, (2) a poor concept of the possible diagnoses which might be correlated with the history, (3) lack of plan for excluding all diagnoses save the correct one, and (4) not infrequently, inaccurate information supplied by the patient, the validity of which is never tested by further systematic observation over a considerable period of time. The longer one practices gynecology the less willing he becomes to accept at face value statements concerning uterine bleeding made by untrained observers.

As a starting point for the solution of gynecologic bleeding problems, one must employ a simple scheme into which the various bleeding patterns may be fitted. Such a classification, which is a modification of Robert Schroeder's original plan, is given below. Many portions of this scheme are self-evident and will require no further elaboration. Certain other entities in the listing are not completely familiar to everyone and to these I should like to devote most of the discussion.

CLASSIFICATION OF UTERINE BLEEDING

A. *Disturbances of menstruation*
  I. Disturbances of *tempo*
    1. Too *frequent* menses
      a. Shortening of cycle
      b. Premature interruption of cycle
    2. Too *infrequent* menses
      a. Prolonged resting period
      b. Persistent corpus luteum
    3. Amenorrhea
      a. Physiological
      b. Primary pathological
      c. Secondary pathological
  II. Disturbances of *quantity* of bleeding
    1. Too *profuse* bleeding
      a. Local interference with control—myomata, polypi, adenomyosis
      b. Pelvic vascular engorgement
      c. Incomplete uterine development
      d. Functional hypertrophy of the endometrium
    2. Too *little* bleeding
      Vegetative ovarian insufficiency
  III. Disturbances of *duration* of bleeding
    1. Too *long* flow
      a. Mechanical interference with healing—myomata, polypi
      b. Irregular shedding of endometrium
      c. Pelvic inflammation
      d. Malignancy
      e. Blood dyscrasias
    2. Too *short* flow
      Vegetative ovarian insufficiency
B. *Non-menstrual bleeding*
  I. Disturbances *under ovarian control*
    1. Endometrial hyperplasia
      a. Juvenile form
      b. Menopausal form
      c. With granulosa and theca cell tumor
    2. Ovulation bleeding
    3. Anovulatory bleeding (cyclic pseudomenstruation)
    4. Artificial causes
      a. Estrogen treatment
      b. Surgery (ovariectomy)
  II. Disturbances *not under ovarian control*
    1. Myomata (pedunculated), polypi
    2. Benign cervical lesions (polyps, erosions, ectropion)
    3. Malignant tumors in cervix, corpus, tube; secondary tumors
    4. Pregnancy complications
      a. Incomplete abortion
      b. Postabortal subinvolution
      c. Ectopic gestation
      d. Hydatid mole and chorionepithelioma
    5. Endometrial infections
    6. Adnexal disease
    7. Vaginal lesions

First it is essential to determine whether the bleeding is menstrual or non-menstrual. We have defined menstruation as the regularly recurring shedding of endometrium which has progressed through the phase of secretion, having been prepared for the reception of the fertilized ovum (progestational endometrium). While there are many apparently valid arguments for a broader definition of the term menstruation, it has been amply demonstrated that less confusion exists clinically when the strict definition of this phenomenon is routinely used. It seems reasonably certain that the basic mechanism ultimately responsible for the extravasation of blood from the endometrium may be the same with varying endometrial patterns. And there can be no denial of the fact that the word menstruation was applied to cyclic uterine bleeding long before we knew anything about secretory changes in the endometrium. But are these valid reasons for adding further confusion to an already disorganized area of thinking? I believe not, and in so believing I have insisted that our undergraduate students be extremely cautious about the indiscriminate use of the term menstruation. One must always pause to ask the question "did this woman really 'menstruate', or would it be more correct to describe her trouble simply as 'bleeding'?" All too frequently the latter is the word of choice.

The disturbances of true menstruation may be divided very simply into those relating to (1) the time at which the bleeding appears, or the interval between two successive menstruations, (2) the quantity of blood which is lost in a given period of time, and (3) the number of days during which the bleeding persists. Obviously some bleeding problems will be concerned with more than one of these three factors. True menstrual bleeding seldom, if ever, appears oftener than every three weeks (from first day of one bleeding episode to first day of the next period). The changes in both ovary and endometrium which precede menstruation presumably cannot occur in less time than this. Regularly recurring menses at in-

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tervals of 21 to 24 days are not uncommon and there is ordinarily no real need to try to lengthen the cycle. Similarly, lengthening of the cycle to five or six weeks, or even longer, is not unusual and there would seem to be no urgent indication for attempts at shortening such intervals. In both of these situations, of course, it is desirable to demonstrate by endometrial biopsy or compelte curettage that the bleeding is really menstrual in character, particularly if the patient in question should be desirous of conceiving.

Amenorrhea should always be considered the result of pregnancy until such time as that possibility has been clearly eliminated. Primary pathological amenorrheas, due to ovarian or pituitary deficiencies, are in the main refractory to treatment and it has always seemed wiser to me to encourage such patients to ignore their misfortune or perhaps even to look upon it as a blessing in disguise. Certainly some of these persons can be made to bleed by the administration of estrogens or progesterone, or both, but such bleeding usually is in no way beneficial to the patient, except mentally. Secondary amenorrheas, appearing at some time after the establishment of genuine menstruation, are associated with a wide variety of both pelvic and constitutional disorders. The outlook here is of course more favorable, providing the underlying cause is located and removed.

Disturbances related to the quantity of blood which is lost during menstruation are difficult to evaluate. What to one patient seems excessive is borne by another without complaint. If anemia due to chronic blood loss cannot be demonstrated, one should be cautious about accepting at full value stories purporting to show an abnormal quantity of bleeding. Direct observation, during the next menses, of a woman with this complaint will often settle the matter without further ado. On the other hand we not infrequently find patients with one or another of the items listed above under "too profuse bleeding" and certainly a search for a myoma (especially the submucous variety) or endometrial polyps always should be undertaken. Myomata particularly, and also adenomyosis uteri interna, may interfere to some degree with the control over bleeding vessels exerted by the uterine musculature. Functional hypertrophy of the endometrium is a very occasional explanation for excessive bleeding and would seem to be the result of an unusually great stimulation by progesterone until a real glandular hypertrophy develops in the secretory portion of the cycle. Only the most widely experienced gynecologic pathologists are accustomed to making this diagnosis. Scanty menstrual bleeding is commonly ascribed to vegetative (follicular) ovarian insufficiency but should not be a matter of concern unless perhaps it be associated with sterility of long standing. However, there is no good reason to assume a direct relationship between the quality of the ovum and the amount of endometrial bleeding which follows the death of the ovum.

Menstrual bleedings which last more than the usual four to seven days are commonly related to myomata and polypi, and bleeding continues over longer periods of time from the endometrial areas affected by such growths largely as a result of interference with normal healing of the endometrial surface. Inflammation of the endometrium itself, or of the myometrium or even the adnexal structures may result in prolongation of the flowing. While most pelvic infections are gonococcal or streptococcal in origin, one must never overlook the possibility of tuberculosis of the internal genitalia. Although it is unusual for a malignant tumor in the female pelvis to manifest itself merely by an increase in the duration of menstrual bleeding, this occasionally is the first sign of an endometrial carcinoma and for that reason alone no menorrhagia of even modest degree should be passed over without thorough investigation. Various disorders of the blood and particularly the blood vessels are well known to be complicated by uterine bleeding which sometimes is virtually uncontrollable. Some of the most disastrous uterine bleeding problems we have encountered were in young women suffering from thrombocytopenic purpura, essential hypoprothrombinemia, and Glantzmann's disease.

Irregular shedding of the endometrium deserves more than passing mention. This disorder has been described in gynecologic literature [1,2,3] off and on for the past thirty years, but, unfortunately, it has never been accorded generally the recognition which it deserves. Its importance lies in the fact that it serves very nicely to explain a considerable number of menorrhagias which would otherwise remain undiagnosed, and thus untreated. Irregular shedding is a specific type of functional uterine bleeding which is characterized by prolongation of cyclic menstrual bleeding from progestational endometrium and often as well by an increase in the amount of bleeding. The clinical history, if accurately obtained, is one of regularly recurring menorrhagia, with the usual interval of 28 to 30 days from onset of one bleeding to onset of next. The duration of bleeding, however, ranges from 8 to 14 days, or even longer in some instances, instead of the usual four to five days. The diagnosis is confirmed by obtaining secretory endometrium by curettage during the course of the prolonged bleeding but far beyond the time when regeneration of the endometrium normally should have occurred.

Curettage should be done on the fifth, sixth, or seventh day of bleeding, at which times the histologic characteristics of this disorder may be demonstrated, namely: marked irregularity in endometrial thickness, absence of surface epithelium, shrunken stroma, collapsed glands with secretory changes in the individual cells, star-shaped glandular lumina (cut in cross section), and numerous thick-walled arterioles. Irregular shedding may occur at any age during the reproductive period but seems more common in parous women. While some patients are relieved of their menorrhagia permanently by curettage alone, in others the typical pathologic picture may recur month after month until hysterectomy becomes the only means of ending the chronic blood loss. Hormonal therapy thus far has not been particularly effective. In women at the menopausal age the treatment of choice is sterilization by X-ray irradiation. In our experience, irregular shedding is found in about 10 per cent of women subjected to diagnostic curettage. It is necessary, of course, to perform the curettement at a time in the cycle when the suspected abnormality may conceivably be demonstrated. Nothing out of the ordinary will be seen in the endometrium if it is obtained during the non-bleeding phase.

Bleedings which are non-menstrual in nature may be divided broadly into that group which is under ovarian control, on the one hand, and another group not directly under ovarian control. Of the first group, endometrial hyperplasia (cystic glandular hyperplasia) is by far the most important. This disorder is too well known to require extensive description here and adequate discussions may be found in most of the standard textbooks. It might be pointed out that the extreme degree of hyperplasia, as exemplified by the "swiss cheese" endometrial pattern, cannot routinely be demonstrated in curettage material. Yet the competent pathologist, furnished the necessary clinical details, can arrive at the correct diagnosis on the basis of many lesser evidences of hyperplasia. For ease of diagnosis, endometrium should be obtained as early as possible after the onset of bleeding. Since patients with suggestive histories of hyperplasia are seen frequently in the non-bleeding phase, curettage then must be postponed until the onset of bleeding.

Hyperplasia is seen most commonly at the two extremes of reproductive life. While the juvenile form usually corrects itself if given sufficient time, an occasional adolescent girl becomes a real problem owing to the persistence of prolonged and totally irregular episodes of bleeding. There is, unfortunately, no completely satisfactory treatment for this disorder in the young woman. The various hormonal approaches popular today are given in detail by Hamblen [4] and the interested reader is referred to his recent monograph. Suffice it to say that time alone is the major therapeutic weapon for these patients, and the temptation to perform hysterectomy in the occasional case should be relegated to the background just as long as possible.

In the menopausal group at least 50 per cent are cured by curettage alone. When bleeding recurs in the menopausal patients after the diagnosis has been clearly established by endometrial examination, sterilization by X-ray irradiation is indicated. Very rarely endometrial hyperplasia is seen in association with granulosa or theca cell tumor of the ovary in postmenopausal women. The tumor in some instances may be so small as to defy detection by ordinary bimanual palpation and one occasionally must resort to exploratory laparotomy to confirm the diagnosis. However, these tumors do not occur sufficiently often to make them a very real problem and I am certain that their importance as a cause of bleeding has been overly stressed in some areas.

Slight bleeding at the time of ovulation is of infrequent occurrence and no therapy is required as a rule. The correct diagnosis should be established, of course, by appropriate measures. Anovulatory bleeding, cyclic in nature, is apparently a common event but is of little concern unless the patient is anxious to conceive. Bleeding following estrogen therapy for menopausal symptoms is now a frequent phenomenon. Ordinarily it is necessary to curet the uterus in such cases since otherwise one cannot exclude malignant tumors. The possibility of producing endometrial carcinoma by administration of estrogens is far from settled, although a case strongly suggesting such a sequence of events has recently been reported by Fremont-Smith, Meigs, et al.[5]

Non-menstrual bleedings which are not under ovarian control are in some instances associated with lesions which have already been mentioned. It is obvious that myomata and polypi may produce bleeding which is not directly related to menstruation, with the result that one may expect both menorrhagia and metrorrhagia to follow these lesions. Many minor bleedings may be attributed to benign cervical lesions but it seems unwise to place too much reliance on such diagnoses; if the bleeding has been anything more than simple "spotting" one should insist upon thorough curettement of both the uterine cavity and the cervical canal.

Malignant tumors must be given serious consideration as a source of bleeding, even in younger patients. While it is clear that much time and effort are expended in looking for early carcinomata, the saving of an occasional life by so doing would seem to be ample justification for the trouble involved. In my experience it has been necessary to hospitalize patients in whom a search for uterine cancer is being made, in order that an adequate sampling of the cervical tissue, both from the portio vaginalis and the canal, may be effected under operating room conditions where lighting is adequate and hemostatic measures are at hand. Complete curettage should be carried out at the same time, and material obtained first from the cervical canal should be collected and examined separately from that which is removed later from the cavity of the corpus. Carcinoma of the fallopian tube is rare and only occasionally is the diagnosis ventured preoperatively. The possibility of this lesion must be considered when persistent uterine bleeding cannot be explained on the basis of uterine curettings. The writer has seen one patient in whom a diagnosis of tubal carcinoma was postulated after three curettements failed to reveal the source of mild but continuous bleeding. After a panhysterectomy, however, it was found that *endometrial* carcinoma existed but had been overlooked because curettage had been done repeatedly in a false passage into the muscularis of the posterior uterine wall.

A common error in gynecological practice is to neglect to think of pregnancy as an explanation for uterine bleeding. Often the patient, intentionally or otherwise, goes to some length to mislead and confuse the physician by supplying inaccurate data. It is well to keep the possibility of pregnancy always in the foreground if one would avoid the embarrassment of entering a pregnant uterus unnecessarily. And on the other hand, it is equally embarrassing to consider everything except pregnancy as a possible diagnosis when in reality the source of the bleeding is quite simple. Ectopic gestation frequently is associated with small amounts of bleeding which may continue over rather long periods of time. While much of this represents sloughing decidua, we have occasionally seen the bleeding continue after regeneration of proliferative endometrium, and curettage in such instances has not been of any aid in reaching the correct diagnosis. For the most part, diagnostic curettage is neither a desirable nor a necessary procedure in the patient suspected of having an extra uterine pregnancy.

Bleeding may be an outstanding feature of hydatidiform mole but one rarely fails to recognize the obstetrical aspect of this problem since the uterus is clearly much enlarged. Uterine bleeding of an irregular nature following the evacuation of a mole must lead one to suspect the presence of chorionepithelioma, at least until such time as that possibility has been eliminated by the usual diagnostic procedures. We have found it advisable to perform a thorough curettage of the uterus immediately following the expulsion or evacuation of a mole, fractionating the tissue and paying particular attention to the last fragments of tissue which have been in immediate contact with the muscularis. These may exhibit definite malignant changes. In this event, hysterectomy may be done at once (with or without preliminary massive X-ray therapy over a short time period) in an effort to forestall the further development of extensive chorionepithelioma.

Endometrial infections of a non-specific nature associated with foreign bodies in the uterine cavity are commonly linked with irregular bleeding. Rarely, one sees abnormal bleeding which is the result of a definite bacteriologic entity such as tuberculosis of the endometrium, but this lesion usually is revealed merely as an incidental finding in women with tuberculous salpingitis. It is well known that menorrhagia or metrorrhagia, or both, may occur in women with inflammations of the tubes and ovaries. Whether this is the result of a primary disturbance in ovarian physiology or to a more direct effect upon the uterus cannot be stated with certainty at present. Yet it is unwise to assume, without complete investigation, that any bleeding in a patient with adnexal inflammation is due solely to the tubo-ovarian disease, particularly if the inflammatory disturbance has passed beyond the very acute stage.

Finally, it is worth pointing out, perhaps, that vaginal lesions may produce bleeding which erroneously is thought to be coming from the uterus. Particularly in the case of senile vaginitis there is often doubt as to the source of the spotting which is complained of and it may be necessary to curet the uterus in order to exclude endometrial carcinoma. Certainly one should not hesitate to do so if there is the slightest question as to the source of the blood. Needless to say, the entire vagina must be inspected with care when a search is being made for a source of bleeding. All too frequently the examiner forgets that the vagina has anterior and posterior walls which are hidden from view when a bivalve speculum is inserted in the usual manner. Lesions in the anterior vaginal fornix are best seen with the patient in the knee-chest posture, using Sims' retractors instead of the bivalve speculum.

An important source of vaginal bleeding is primary carcinoma of the vagina. While it is not difficult to recognize the malignant character of these lesions, the distinction between a vaginal and a cervical tumor may not always be perfectly clear, especially if the growth is rather large and has arisen in the upper vagina. Much care should be taken to differentiate these lesions since the treatment is not altogether the same and certainly the prognosis is infinitely worse for the primary vaginal tumor.

To summarize briefly, gynecologic uterine bleeding is a subject with many ramifications. In order to arrive at the correct diagnosis, one must combine an accurate and detailed clinical history with a most thorough physical examination, supplementing the information so obtained with histologic material removed from various portions of the generative tract at times when the answer to the problem is likely to be forthcoming.

Of equal importance is the interpretation of the pathologic material in the light of the patient's history, and for this reason the pathologist must always be informed as to the pertinent details. This is particularly true with respect to endometrial specimens. It would be well for all pathologists to refuse to offer an opinion when the necessary clinical information is not furnished. Nothing is to be gained by making a guessing game out of scientific diagnoses. Better yet, the clinician should be prepared to act as his own pathologist, or at least should have sufficient knowledge to evaluate critically the opinion submitted from the laboratory. Altogether too many serious therapeutic errors have been committed because of blind faith in supposedly authoritative reports emanating from pathological laboratories.

The causes of uterine bleeding are numerous, but the general picture is much simplified if a primary separation into menstrual and non-menstrual forms can be made. The former may be related to time, quantity, and duration, and the latter may be subdivided according to whether the bleeding is regulated in any way by the ovary. It is then a simple matter to fit in the specific clinical entities, as has been done in the schema shown above. Gradually we are whittling down that rather large group of bleeding patients for whom, in the past, no specific diagnoses could be found, and it will be a happy day when only an occasional patient leaves behind her a hospital record marked "menorrhagia, cause undetermined."

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Roentgenographic Aids in Carpal Scaphoid Fractures

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Fractures of the carpal scaphoid occur typically in young men under conditions of strenuous activity. The usual cause is a fall on the outstretched hand. The classical findings of pain and tenderness over the anatomical snuffbox may be overlooked, and the condition considered a sprained wrist; the patient may neglect to see a physician during the early period when nonoperative treatment is most effective. In the millions of soldiers in the Army of the United States in World War II, the incidence of carpal scaphoid fractures resulted in a directive that all sprained wrists be treated as fractures of the carpal scaphoid until proven otherwise.[2]

The early clinical diagnosis of fracture of the carpal scaphoid should be confirmed, if possible, roentgenographically. Valuable information can be obtained not only as to the presence and location of the fracture, but also its duration, prognosis and the necessity for further immobilization. Injuries may also be noted in the adjacent bones.

Diagnosis

Routine lateral and anteroposterior (Figure 1) views of the wrist may be entirely normal in appearance, in the presence of a fracture of the carpal scaphoid. However, if the roentgen rays are projected at a slightly different angle as in the oblique view, the fracture line is readily evident (Figure 2). In such cases failure to establish the correct diagnosis by oblique views can result in absence of proper treatment and prolonged or even permanent disability.

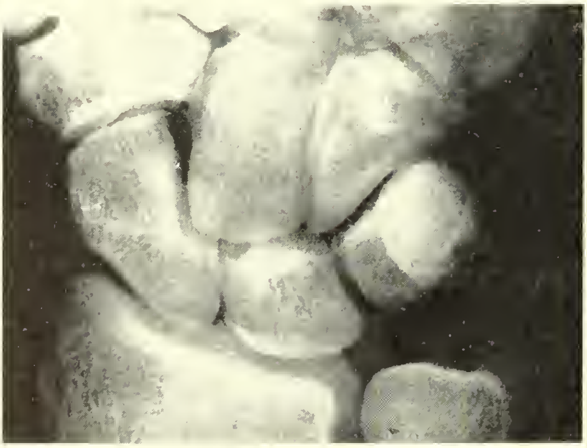

Figure 1. The anteroposterior view above, as well as the lateral view, reveal no evidence of fracture; clinical history and findings were typical of a carpal scaphoid fracture.

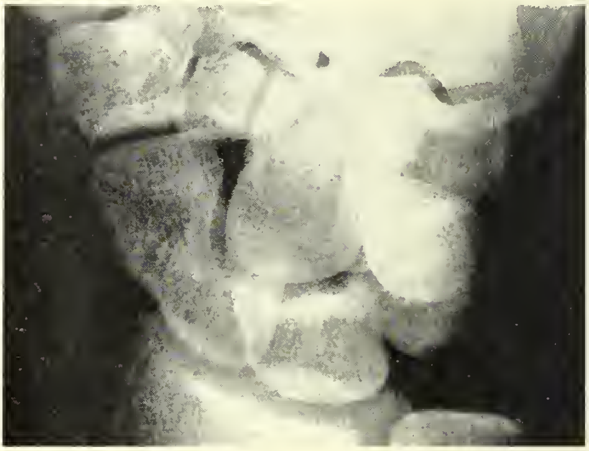

Figure 2. Oblique view of same case seen in Figure 1, demonstrating fracture line in the distal half of the carpal scaphoid (extending distally from the radial border in an ulnar direction.)

Occasionally a fracture line is seen in the anteroposterior view apparently extending through only a portion of the diameter of the scaphoid (Figure 3). Such fractures can usually, by means of oblique views, be demonstrated to extend entirely across the diameter of the scaphoid (Figure 4). These fractures which appear incomplete on routine views require the same prompt treatment as those in which it is more evident that the fracture line involves the entire diameter of the scaphoid.

Rarely the fracture cannot be demonstrated radiologically until two or three weeks after injury. It is essential to keep all suspected cases under observation until the presence or absence of a fracture can be definitely established roentgenographically.

Age of Fracture

Early the fracture line is seen as an abrupt loss in continuity of the trabeculae of the scaphoid; the fracture line is distinct and sharp (Figures 2, 3, 4). Without proper immobilization, absorption of bone occurs at the fracture site so that after several weeks a cystic appearance is present (Figure 5). Several months later dense sclerosis appears at the margins of the fracture in cases which have not been immobilized (Figure 6). With the passing of years a typical pseudo-arthrosis forms between the segments of bone and cystic changes frequently appear in one or both fragments (Figure 7). The latter changes in trabecular structure clearly differentiate the condition from congenital bipartite scaphoid which is frequently bilateral.

Prognosis

Loss of blood supply to the proximal portion of the scaphoid frequently results from interruption of the nutrient vessels within the bone at the fracture line, particularly when the latter is located proximally. In such cases the affected segment of bone appears unusually dense as contrasted to the adjacent osseous structures. Although union may occur at the fracture site (Figure 8) and be followed by revascularization of the avascular fragment, the prognosis is poor; when such necrosis (Prieser's disease) occurs in the scaphoid, a permanent normal function in the wrist cannot be anticipated regardless of the treatment. Arthritis is prone to occur.

The prognosis is also dependent on the age of the fracture. With early institution of treatment the outlook is generally more favorable than with late recognition and therapy.[1]

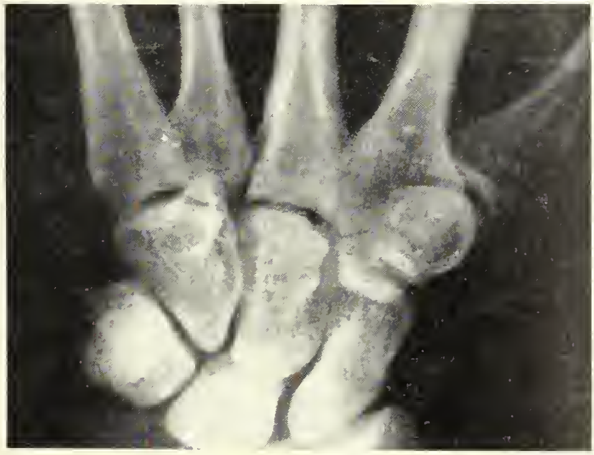

Figure 3. Anteroposterior view of wrist with apparent incomplete fracture line in scaphoid.

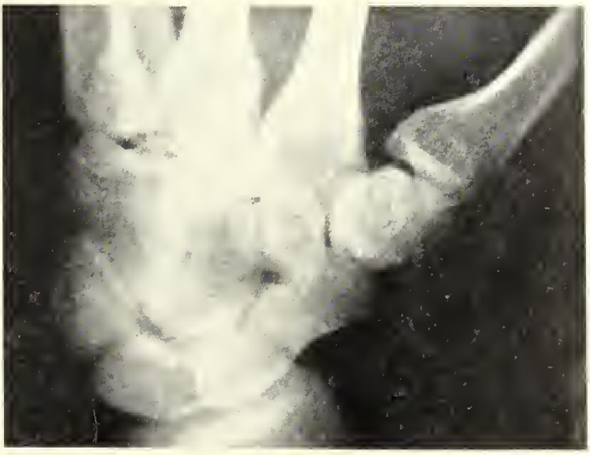

Figure 4. Oblique view of same case shown in Figure 3, demonstrating the completeness of the fracture line.

Duration of Immobilization

The old rule of eight weeks immobilization for carpal scaphoid fractures has not proven trustworthy in the ex-

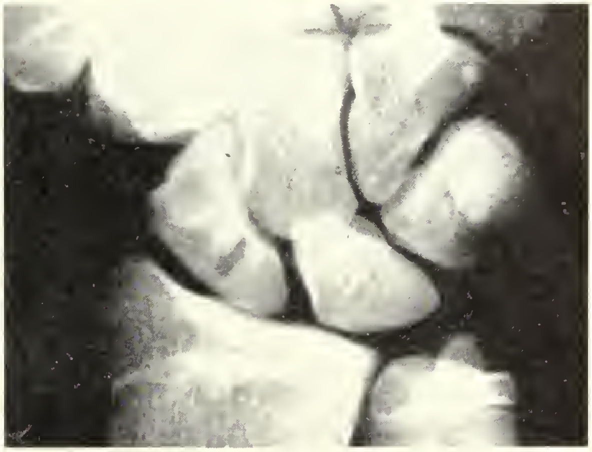

Figure 5. Five weeks previously while running this youth had fallen on his outstretched hand, injuring his wrist. Roentgenogram shows typical cystic appearance at five weeks.

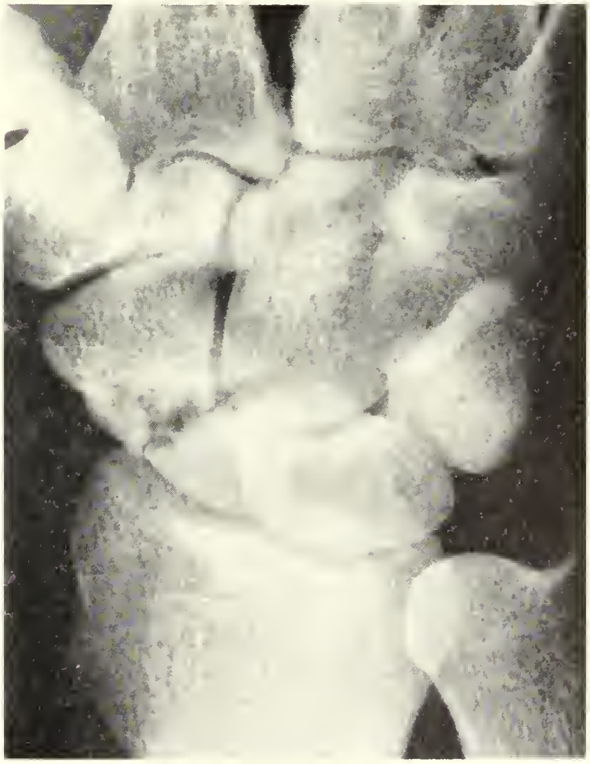

Figure 6. Six months previously the above patient fell while playing baseball and injured the wrist. Note the added sclerosis at this period as compared to Figure 5.

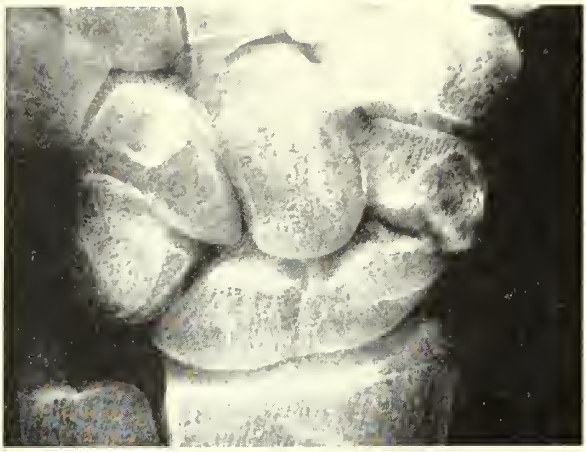

Figure 7. Fracture of the carpal scaphoid which had occurred twenty-seven years previously; was thought to be a sprain at that time. A typical pseudo-arthrosis is seen in the scaphoid continuous with the midcarpal joint; a large cystic area is located in the distal scaphoid fragment. Roentgenograms of opposite wrist were normal.

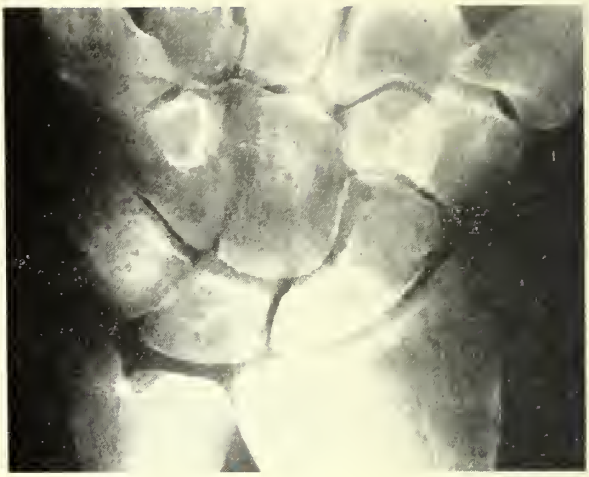

Figure 8. Despite the presence of aseptic necrosis (Prieser's disease) of the proximal scaphoid segment, bony union has occurred at the fracture line.

perience of the past decade. Once treatment has begun, the fracture should be completely immobilized until bony union has occurred as demonstrated roentgenographically in all views. Even then an additional three weeks of immobilization may prevent the infrequent reappearance of the fracture line in a supposedly healed carpal scaphoid fracture.

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COMMON DERMATOLOGIC DISEASES

(Continued from page 89)

keratoses and of leukoplakia is generally indicated and can be accomplished by radiation or local destruction with cautery. Seborrheic keratoses are usually deep brown in color and are covered with a greasy scale. Although they less frequently undergo malignant change, they often indicate treatment because of cosmetic disfigurement or by changes suggesting malignant degeneration. Local destruction with cautery is simple and effective.

Carcinoma of Skin

Carcinoma of the skin must be ruled out by microscopic examination of the tissue in every plaque, nodule or ulcer which does not heal in a reasonable time, especially in a patient of 40 years or more of age. Eighty per cent occur on the face and neck. They may be of three types: (1) Basal cell carcinoma, which would constitute two-thirds of all types, if the mucocutaneous junctions were excluded. Basal cell carcinomas do not metastasize and are malignant by local destruction. When located near the eyes, they may involve the orbit. (2) The squamous cell carcinomas offer a much greater hazard to the life of the patient in that they may metastasize. They are most commonly found on the face below the level of the nose, particularly the lower lip, the posteroface and the ears. They may also be present on the hands and penis. The adjacent glands are usually first to be affected with metastases. Two-thirds of all skin carcinomas are squamous cell in type, if the mucocutaneous junctions are included. (3) Ten to twenty per cent of skin carcinomas are mixed squamous cell and basal cell in type. Inasmuch as most skin carcinomas are found on the face, careful palpation of the neck glands is of utmost importance in the squamous cell type to detect whether metastases have occurred. Treatment with X-ray, radium or surgery offers a 95 per cent chance of cure if the cancers are detected early. Where metastases have extended to the neck, a radical resection of the cervical glands and radiation therapy offer at least palliation and, in some cases, the chance of cure.

MINNESOTA HEALTH, NEW BULLETIN

A new monthly news bulletin, *Minnesota Health,* published by the Minnesota Department of Health, made its first appearance in January. The purpose of this bulletin is to present current activities and plans of the Health Department and to foster better health in the community.

Copies are sent to physicians, dentists, sanitary engineers, public health nurses, school personnel, libraries, health and welfare associations, members of the state legislature, and other groups and individuals known to be particularly interested in health.

For further information write to Netta W. Wilson, Editor, University Campus, Minneapolis 14.

A Few Essentials in Prescribing Physical Medicine in General Practice

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Physical medicine may be defined as the employment of physical and other effective properties of light, heat, cold, water, electricity, massage, manipulation, exercise and mechanical devices for diagnosis or physical and occupational treatment of disease. To prescribe physical medicine properly, a physician should know the basic physical principles involved, the physiologic effects of the agents and the procedures to be used, the agent or instrument most likely to be effective in each condition, how long these procedures should be used each day and which procedure should be used.

The physician should know the pathologic or functional changes in conditions to be treated and the individual tolerance of the patient. Undoubtedly, it will be years, if ever, before the exactness of dosage of the agents and procedures of physical medicine will be comparable to that of drugs.

The lack of exact knowledge of the effects of many agents relative to time, intensity and dose does not allow precise statements to be made. However, some of the factors which should be known in order to prescribe some of the most commonly used physical agents adequately will be pointed out. These will be discussed under the general headings of thermotherapy, massage and therapeutic exercise. Electrotherapy, other than the use of the high frequency currents for thermotherapy, will not be discussed.

THERMOTHERAPY

Thermotherapy is the application of heat for therapeutic purposes. Heat is a form of irregular molecular motion. Thermal energy can be passed from one body to another by means of transmission of this irregular motion. The primary physiologic effects of heat are antispasmodic, analgesic, decongestive and sedative. Also, heat increases the exchange of oxygen and hastens the absorption of exudates. It is a vasodilator, increasing the amount of blood brought to a region. It increases the local metabolism or the general metabolic activities.

The indications for the use of heat for therapeutic purposes are often not considered because heat is so commonplace. Its action and value as a therapeutic agent, although not fully investigated are well established.

There are several means by which heat can be applied locally for therapeutic purposes: (1) the convective, (2) the conductive and (3) the conversive method. The physiologic effects of these various forms of heat are basically the same. The main difference between them is the difference of the depth of penetration of the energy.

Convective heat (infra-red radiation). Convective heat is produced primarily by the various types of heat lamps and luminous bakers.

Infra-red energy is emitted by all hot objects. These may include lamps, bakers, household electric heaters, stoves, hot water bottles and electric pads. The latter two, however, are of such low intensity that they are used primarily as conductive heat.

Selection of sources of infra-red radiation. The infra-red portion of the spectrum extends from about 770 to 15,000 m μ. The maximal emission lines will depend on the temperature of the source. The shorter the rays the higher is the temperature necessary to produce them and the more penetrating they are. The so-called infra-red generator, which consists of wires coiled around porcelain, steatite or carborundum cores and plates, reaches a temperature of about 300° C. The carbon filament bulb reaches a still higher temperature and the tungsten filament bulb produces a white heat. The emission lines from the latter source are in the shortest wavelengths of the infra-red portion of the spectrum. Infra-red sources producing short wavelengths are usually the apparatus of choice because the skin can tolerate about twice as much energy from infra-red radiation of short wavelength as it can of infra-red radiation of long wavelength. This is the reason that infra-red lamps producing rays of short wavelength are the apparatus of choice.

The dosage of infra-red irradiation is far from being exact but the distance of the source of heat from the part to be treated, time of application and frequency of treatment may be specified when prescribing such treatment. There is a tendency to use most luminous sources too far away from the part; this is particularly true of the small lamps. Twenty-four inches (about 61 cm.) is about the minimal distance from the skin that the infra-red nonluminous generators can be used although the tolerance of the skin to heat is different in various parts of the body.

The tungsten filament source can be used at a distance of from 14 to 18 inches (36 to 46 cm.). At this level the cutaneous temperatures are raised much higher than they are at 18 inches or more and the heat can be readily tolerated by the patient.

The type of reflector is a factor which is of importance in selecting the source of infra-red radiation. The 250 watt bulb with a carbon or tungsten filament in a bowl or cup-shaped reflector is a commonly used apparatus. There are indications[1] that with the use of carbon or tungsten filament in a cup reflector the maximal region over which the heat energy strikes the skin is only about 8 to 10 cm. in diameter when a tungsten filament bulb is used, and therefore, such a lamp is not effective in the treatment of any large areas such as the whole back.

Read before the meeting of the South Dakota Medical Association, Aberdeen, South Dakota, June 4, 1946.

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Definite "hot spots" were noted when carbon filament bulbs were used. Therefore, it becomes obvious that the patient will not tolerate energy any hotter than that of the small hot areas and that burns are more likely to result than when a lamp which produces a more even distribution of heat is used.

Lamps with 1,500 watt tungsten filament bulbs in large reflectors produce a wide area of fairly uniform heat. These are much more effective in heating large areas such as the back, thighs and legs than the 250 watt lamp with a carbon or tungsten filament bulb in a cup reflector.

The angle at which the rays strike the part affects the efficiency at which the heat energy is applied. The maximal effectiveness of the rays is present only when they strike at a right angle to the skin. Therefore the larger apparatus, such as the luminous bakers with four to twelve bulbs of either carbon or tungsten filament, will produce the most uniform type of heating of any of the various apparatus for production of infra-red rays. The baker can be adjusted to a desirable height and if the heat energy is measured, it is found to be about the same over all areas beneath the reflecting surface.

The dosage for infra-red radiation is far from being exact. There has been a tendency in the past to give the order "infra-red" without specifying distance, type of reflector, time for any one application or frequency with which the radiation should be used.

There has been a tendency to order the use of various forms of heat for from fifteen to twenty minutes. Studies [2] of cutaneous temperatures have indicated that the maximal elevation of cutaneous temperature is not reached before twenty to thirty minutes. It would appear, therefore, that in order to obtain the maximal vasodilatation from the use of a given amount of heat energy, the minimal time for each treatment should not be less than thirty minutes.

The infra-red sources are probably the least effective sources of heat for treating the hands, forearms and feet. Much of the surface of the hand for instance is not exposed to heat energy from this source at any one time. Some of the other agents such as paraffin, which entirely surround the part and eliminate loss of heat as well as apply conductive heat energy, are more effective.

When heat is indicated in treatment of several portions of the body, for example, involvement of multiple joints, several methods of general bodily heating have been found to be more effective than local heating in producing high elevation and long maintenance of cutaneous temperature. Elevation of cutaneous temperatures produced by general heating was found [3] to be maintained two to three times as long as when local applications were used. It becomes obvious that if there is multiple involvement, such as in rheumatoid arthritis, maximal vasodilatation is desirable. General heating, even though it may produce a slight elevation of bodily temperature, therefore, is the method of choice whenever it can be tolerated. There are few instances in which this type of heating can not be readily tolerated. Two large infra-red luminous bakers when used for thirty minutes over the entire body produce rather extensive general elevation of the cutaneous temperatures comparable to those produced by other methods.

In prescribing infra-red irradiation these basic considerations must be remembered: (1) The hotter sources, such as the tungsten filament or the carbon filament, are most effective. (2) The large lamp or baker is more effective than other sources for all but small areas. (3) Small lamps should be used at a distance of 16 to 18 inches (41 to 46 cm.), and the bakers should be used at a distance producing a comfortable warmth. (4) The duration of each treatment should be definitely specified and in most instances should be at least thirty minutes. In conditions in which circulation is poor or debility is marked, the intensity of the heat may be modified. This should be specified in the prescription. (5) The frequency with which heat may be used varies with the various types of conditions to be treated. This type of heat may be prescribed several times a day or it may be used more or less continuously at low intensity in some inflammatory or painful conditions. In general, infra-red radiation should be administered daily over a period of several days or weeks depending on the response of such conditions to the treatment.

It is possible in many instances that greater therapeutic effects could be obtained from the use of these heating agents if they were given more frequently and properly prescribed in the beginning.

Conductive heat. In conductive heating, the heat is applied directly to the body by continuity. The devices include semisolids such as paraffin, various types of wet packs, hot water and electrically heated devices of many types.

Application of hot paraffin is a clean and effective method of raising temperatures of rounded regions of the body such as a knee, lower back, foot or hand. Its main advantages are that it holds the heat, is easily available, entirely surrounds the part when used on hands and feet and produces good hyperemia. The paraffin is melted in a double boiler and allowed to cool until there is a thin scum over its surface before it is applied. It is particularly advantageous for home treatment in localities where electricity is not available. It should be prescribed in the same manner as any other local heat; namely, for periods of thirty to forty minutes at daily intervals. The hands and feet can be dipped into the paraffin repeatedly until the paraffin is about ⅛ inch (0.3 cm.) or more thick and then the part is wrapped in toweling for at least thirty minutes. The paraffin then can be removed and saved for reheating. Paraffin can be painted on other parts of the body with a brush or stick with a cloth on it until there is a thickness of ⅛ to ¼ inch (0.3 to 0.6 cm.) and left on for half an hour or more. If hairy surfaces are to be treated with paraffin, mineral oil should be rubbed over the part to prevent the paraffin sticking to the hair.

Other methods of applying conductive heat include the use of compresses and various types of hot wet packs. In prescribing these a few points must be remembered. If stupes or packs are not carefully wrung out, they should not be of temperatures of more than 120° F. A frequent mistake made in prescribing applications of moist heat of this type is that it is often expected that they will stay warm or hot for a considerable time. In most instances they do not remain warmer than the bodily temperatures for more than fifteen minutes. Therefore, when packs are used, orders should be given to change frequently or to use some controlled heating device to maintain the heat.

The so-called Kenny pack is somewhat different from the compress in that it is made of woolen material which is heated in boiling water and wrung sufficiently dry so that no droplets of moisture remain in the cloth. It is applied immediately and directly to the part and wrapped in insulating material. The prescription for these packs in the treatment of poliomyelitis (they may also be used in other types of painful muscular or neurologic conditions) varies in different medical centers. Most workers use them four to eight hours a day and change them every half to one hour. It should be remembered that these packs do not remain hot more than fifteen to twenty minutes. After they become cool, they are likely to increase the pain. Therefore, if they are not used in a warm room and are not changed frequently, they may increase the pain and soreness rather than decrease it.

Application of conductive heat by means of water includes many types of local baths. However, the most commonly used are the whirlpool and the contrast baths. Hot water of the whirlpool bath completely eliminates the loss of heat from the part being treated. Agitation of water by means of aeration or motor driven turbines gives a mild massage and is an effective method of producing hyperemia and stimulation of blood flow. The whirlpool bath is used for fractures, sprains, posttraumatic lesions, postoperative skin grafts, indolent wounds and in certain types of painful conditions, such as neuritis and neuralgia.

The temperature of the water may vary according to the condition of the patient to be treated but it should always be specifically prescribed. If there is any circulatory disturbance, the temperature of the water usually should be less than 101° F. so that it will not tend to produce damage to the tissue. If the circulation is adequate, the temperatures prescribed should be between 105° to 110° F. The duration of the bath in most instances should be thirty minutes, and it is often advantageous to order baths twice daily.

The contrast bath is a simple method of producing hyperemia; its exact action is not entirely known. This type of bath is especially useful for home treatment of rheumatoid arthritis, peripheral vascular disease and other painful conditions of the hands and feet. It consists of alternating the part between hot and cold water. The treatment is always started and stopped by placing the part in hot water. The time for the initial immersion of the part in the hot water is ten minutes and thereafter the part is placed alternately in cold water for one minute and in hot water for four minutes for three to four alternations, always ending with immersion of the part in hot water.

Contrast baths should be prescribed for definite periods, usually between twenty and thirty minutes, and should be used twice daily. They are frequently used in peripheral vascular disease and rheumatic conditions and can be carried out over a period of months by the patient in his home. The patient should be carefully instructed about the temperatures of the water to be used when these baths are being prescribed for home treatment of peripheral vascular disease or diabetes mellitus.

Hot tub baths in which the temperature of the water is gradually increased to 104° to 105° F. are used to elevate bodily temperature. Warm water is probably the most efficient method for the production of elevation of bodily temperatures. It is so efficient that it may become dangerous. For this reason, it is generally used for thirty minutes only and never for more than one hour. It is advisable to prescribe that the temperature of the water be gradually raised from 98° or 100° F. to 105° F. in a period of thirty minutes. The bodily temperature then will rise to 100° or 101° F. or higher if the treatment is prolonged for forty to forty-five minutes. If the patient is placed in the bath with the temperature of the water 104° to 105° F., he is much more likely to have undesirable side reactions than if the temperature is gradually raised to this point.

This type of treatment is effective in rheumatoid arthritis and can be used in almost all rheumatoid conditions. Baths should be prescribed cautiously for patients who are more than sixty or sixty-five years of age, those who are extremely debilitated or those who have some condition which contraindicates elevation of bodily temperatures.

It should be remembered that when the bodily temperatures are elevated, considerable fluid is lost through perspiration. The patient, therefore, should be given at least 1 or 2 glasses of water or an equivalent of 200 to 300 cc. of fluid in thirty minutes in order to prevent some of the exhaustion that may occur as a result of loss of fluids. The direction for this should be incorporated in the order for the treatment.

Conversive heat. This type of heat is produced by high frequency currents to which the tissues offer resistance and thus become heated. Since conventional diathermy is not used extensively and the apparatus has become obsolete, it will not be discussed here although it continues to have a definite field of usefulness in physical medicine.

Short wave diathermy is produced by machines with oscillating tubes. The wavelength of these machines varies between 4 and 30 meters; most of these machines have a frequency of more than 10,000,000 cycles per second.

The only important physiologic effect of high frequency current is that of heat. The main advantage of these currents as thermal agents is that they have much deeper penetration than any other form of heating. For this reason, in any condition in which deep heating of the tissues is indicated, the high frequency current is the physical agent of choice.

Short wave diathermy has many applications. However, there are simpler methods of applying heat. This is especially true if there are many areas to be treated, such as in involvement of multiple joints.

The most effective local heating by means of short wave diathermy is produced by the air-spaced electrodes, electromagnetic cable or so-called drum. After proper air spacing (¾ to 1½ inches [1.9 to 3.8 cm.]) by means of toweling or other absorbent material, the cable may be draped or coiled over a part or can be wrapped around extremities. The so-called drums are constructed so that they are properly air spaced and may be applied directly to the skin with only one thickness of toweling over the skin for sanitary purposes and to absorb perspiration. The air-spaced electrodes likewise are constructed to provide adequate air spacing and can be applied on both sides of a part to be treated or parallel on the part.

The prescription should specify the region to be treated and if the physician wishes a specific method of application used other than the routine one, he should instruct the technician carefully.

At times it is necessary to specify the position in which the patient should be placed while the treatment is being given. If treatment is to be given on an inner spring mattress, the technician should be instructed carefully as to the distance that the electrodes are to be placed from the mattress. The possibility of heating the springs in the mattress is not great if the applicator is 1 foot (30 cm.) or more away from the mattress.

In cases in which there are scars in the tissue to be treated specific directions should be given to keep the intensity of the current low in order that burns may not occur around or in the scar tissue where the circulation may be inadequate. Adhesive tape in the area to be treated should always be removed from the skin.

If short wave diathermy is applied over wounds, the presence of any metal or excessive drainage should be noted. The pieces of metal should not be allowed to remain next to the skin. If there is any drainage, the wound should be dried carefully before the high frequency current is applied. High frequency currents should not be applied over regions of anesthesia except with extreme care. Neither should they ever be applied to a region where circulation is impaired, as in peripheral vascular diseases. However, they may be used to some advantage in these cases to produce reflex vasodilatation by heating remote regions; namely, the lower part of the back. This may be done by having the patient lie on the electromagnetic induction cable and covering him with a woolen blanket. The treatment may be prescribed for a period of twenty to sixty minutes, once or twice daily. This type of treatment is indicated in cases in which other methods of producing vasodilatation, such as the use of typhoid vaccine, are contraindicated.

MASSAGE

Massage may be defined as systematic and scientific manipulation of tissues for therapeutic purposes. The physiologic effects are an increase of the flow of venous blood and lymph produced by actual mechanical propulsion of these fluids toward the heart, increase of the circulation brought about by reflex stimulation, and a stimulative or a sedative effect on the sensory nerve endings. Massage also produces a mild elevation of cutaneous temperatures.

Massage is far from being an exact science. Some of the lack of the scientific knowledge relative to it is due to insufficient standardization. The technic, both as to the method of applying and as to the time it is administered, is widely variable. However, massage is an important part of physical medicine in treatment of rheumatic, neurologic and many traumatic conditions.

Massage can be either stimulating or sedative; therefore, it should be known which type is desirable and it should be specified. The sedative type of massage is the most widely used for therapeutic purposes.

Three movements of massage are used primarily. These are stroking, kneading and friction. Percussion movements, such as hacking, clapping and the like, are rarely used for therapeutic purposes.

Stroking massage consists of long stroking movements with the hand moving slowly, gently and rhythmically over the skin. The pressure may be superficial, in which case the effects are obtained through the reflex mechanism; or the pressure may be deep, in which case actual mechanical emptying of the venous and lymphatic vessels is produced. It should be remembered that if the vigor and speed of these movements are increased, the effect of the massage may be stimulating rather than sedative.

Kneading consists of wringing or compression movements. The muscles may be picked up or lifted from the bone, rolled, squeezed or wrung. The intensity of the pressure may be variable and should be specified when the massage is prescribed. In most instances in which the mechanical and sedative effect is desired both stroking and kneading movements are used.

Friction massage consists of a deep circular rolling movement and is employed especially in treatment over scars or chronic conditions of the joints, in loosening adhesions and in promoting absorption of exudate. It is never used with any kind of lubricant on the surface of the skin. The amount of pressure should be specified. The prescription should state whether deep friction movements, which are used in treatment of fibrositis, are desired or whether some modifications should be made as in the treatment around recently healed wounds.

If the reflex effect is desirable primarily, light stroking massage may be ordered; the only effect possible then would be that obtained through reflex mechanism. A sedative effect on pain and muscular soreness and also muscular relaxation may be produced. This type of massage is used in painful conditions such as early fractures, neuritis, neuralgia and the like. In most instances in which the mechanical effects of massage are desirable, it may be advisable to use both stroking and kneading movements. These may be ordered as either "light" or "deep" stroking and kneading. This type of order is given for the treatment of most rheumatic conditions, chronic lesions of the joints, nonpainful neurological conditions and conditions resulting from trauma.

Stimulating massage means that type of massage in which stroking, kneading, friction and percussion movements are given rapidly and vigorously. As mentioned previously this type of massage is rarely ordered except in certain neuropsychiatric conditions.

The time for which massage may be given is variable also. It is considered that fifteen minutes of massage should be given to the back, ten minutes to the lower extremities and five to ten minutes to the upper extremities.

In order for a physician to prescribe massage adequately he should be aware of the types of massage used for therapeutic purposes and the proper methods of administration and he should be able to recognize a good technic. Massage given too heavily, too vigorously, or too roughly will yield poor and even harmful results. Massage should never be prescribed without specifying the type desired and should never be given by untrained persons except in cases in which it may be used for home treatment. The physician or a technician who has been properly trained then should instruct the patient's relatives how to do a few simple strokes that may be indicated.

THERAPEUTIC EXERCISE

Therapeutic exercise has become one of the most important agents or procedures in physical medicine. The proper use of therapeutic exercise requires specialized technical knowledge. There has been a tendency in the past for the physician to assume that technical knowledge is all that is necessary, therefore, much has been left to the judgment of the technician and the physical educator. These technically trained people do not have sufficient medical knowledge to use therapeutic exercise adequately without medical guidance and definite prescriptions to follow. In a short discussion of this kind only a few important points relative to this extensive field can be emphasized.

Some of the important physiologic effects of exercise are as follows: (1) it increases circulation; (2) it increases muscular strength; (3) it prevents muscular atrophy and in some instances decalcification of bones; (4) it assists in maintaining normal range of motion and (5) it helps to re-establish many former patterns of motion or to establish new patterns of motion in various conditions resulting from lesions of the central nervous and musculoskeletal systems.

To prescribe exercise adequately requires a knowledge of the functional anatomy of the part and the ability to recognize malfunction. The pathologic and physiopathologic changes in the part to be treated and the effects expected also must be understood. Furthermore, the physician must have the ability to judge the type of exercise which would be most effective, the ill-effects which may be produced and when to start, modify or stop the exercise.

Therapeutic exercise is generally classified under the following headings: passive exercise, active assistive exercise, active exercise, and active resistive exercise.

Passive exercise. Passive exercise means movement of the part as a result of an external force usually applied by the technician. There is no participation in the movement on the part of the patient. Passive exercise is useful as a preliminary to active movement and when active contraction of muscle is contraindicated. It is useful in conditions in which active movement may cause some anatomic malalignment or other disturbances, as in the case of incompletely healed fractures.

Passive exercise is used to retain the full movement of joints and prevent the loss of the sense of position and to stimulate consciousness and feeling of position of the part and the proprioceptive impulses, particularly in cases of paralysis due to poliomyelitis, peripheral nerve injuries and various types of peripheral neuritis. Passive exercise is rarely indicated except in cases in which active exercise cannot be done because of paralysis or in which active exercise may produce anatomic malalignment.

If passive exercise produces pain, muscular spasm and resistance on the part of the patient, it ceases to be a passive exercise. The amount of forcing or stretching should be stipulated exactly.

Active assistive exercise. In this type of exercise the patient makes an active effort to move the part, and the technician or some mechanical agent assists him to complete the motion. The exercise is generally used to obtain increased motion of the joints and to assist in re-educating and strengthening the muscle to a point where active free exercise can be done.

Active assistive exercise is used extensively in all types of muscular weakness resulting from lesions of the central nervous system or other causes in which strength is not sufficient to move the part against gravity. It is the most frequently prescribed exercise in the treatment of fractures, chronic conditions resulting from trauma, joints which are limited from contractures and chronic inflammatory lesions, such as rheumatoid arthritis.

Active exercise. Active exercise usually means free exercise that can be performed by the muscle without the aid of external forces. This may imply a great many activities from that of producing normal range of motion of the joints against gravity without assistance, to that of actual gymnastics. Active exercise is used primarily for the maintenance of normal range of motion, stimulation of circulation, prevention of atrophy, strengthening of muscles and the re-education of muscle groups and is used in reconditioning of patients. When it is being prescribed, specifications should be made concerning how many active contractions are desirable for the given condition and which muscles are expected to be strengthened. When active exercise is used for re-education of muscles in various types of neurologic conditions, the physician should specify on his order which muscles have to be strengthened, which groups are not co-ordinated and what deformities may be expected to be corrected by the exercise. In prescribing active exercise the graduation of the amount of exercise that is being given should be ordered and this order should be followed carefully.

Active resistive exercise. Active resistive exercises are those in which the patient makes an active effort to move the part and the technician resists such effort or motion or in which the patient uses some of his own antagonistic groups of muscles to produce the resistance. Likewise, graduated resistance may be used in the form of weights and other apparatus whereby the resistance may be measured accurately. In general, active resistive exercises are

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Psychosomatic Diagnosis

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> *"As a man thinketh in his heart, so is he."*
> —SOLOMON

ALTHOUGH the role of mental and emotional factors in disease has been recognized since the early days of medicine, it is only within the last twenty years that psychosomatic medicine has been treated as a scientific discipline. Even before medical science recognized the close interrelationship between psychic phenomena and somatic disease, the idioms of our language indicated man's appreciation of how a mental state can reflect itself in body function. If a person through care or worry about something developed occipital-nuchal tension with ensuing pain, the situation was said to "give him a pain in the neck"; if one were emotionally disturbed over the death of a dear one "his heart was broken"; a revolting spectacle "turns one's stomach"; a timid soul "has no guts"; a source of constant annoyance "gets under one's skin"; a startling disclosure "knocks your eye out"; a bit of unexpected news "takes your breath away," and a highly provoking situation "makes your blood boil" (elevates the blood pressure). In other words, long ere the scientific world eliminated from medical thinking the dichotomous concept of man, common man himself through the development of idioms in his speech testified to the unity of mind and body. Recent physiological research has shown that changes in the body which are associated with emotional stimuli are basically changes in temperature, electric potential and chemical composition. The neural pathways over which an idea may give rise to a physical symptom, such as blushing, increase in heart rate or "watering of the mouth" are now well known. Years of research and the study of thousands of patients have swept away all doubt as to the validity of the psychosomatic concept.

At present psychosomatic medicine is in the limelight. In fact, it seems that there is danger of over-emphasizing the importance of psychic factors in disease and ascribing too great a portion of the clinical picture to the "functional overlay." Admittedly every disease has both psychic and physical components. However, the word "psychosomatic" is already in danger of becoming an all too convenient label for *any* illness in which there is a psychic factor and in which the dynamisms are not immediately clear. There is danger that in lieu of a careful and painstaking examination to discover primary organic etiologic factors in a given case, physicians will, after a cursory glance at the problem, label it "psychosomatic" and neglect definitive treatment directed at the organic substratum. This state of affairs has not yet come to pass but in view of the accolade given the psychosomatic concept one feels that a note of warning should be sounded. It must be remembered that bacteria still can grow, tumors still can develop, degenerative processes still can take place and glandular dysequilibria still can occur independently of any causal relationship to the psyche of the patient.

Therefore, our thinking about psychosomatic disease must be accurate and careful. The term should not be applied indiscriminately to every condition in which a psychic factor is operating, for if that were the case every illness would belong in the field of psychosomatic medicine. In the strict sense of the term, psychosomatic disorders are those in which demonstrable physiological alterations or structural changes result, fully or in part, from psychogenic processes. By restricting the use of the term to such conditions, we exclude the "somatopsychic" entities, viz.: disturbances in the mental life of a person which result from somatic disease, *e.g.*, cerebral arteriosclerosis, brain tumor, syphilis, alcoholic intoxication, vitamin deficiency, the deliria, and the like. In a psychosomatic disorder the original deviation must be in the psyche of the individual, and the somatic disturbance must begin as a functional excitation—hyperacidity and changes in the gastric mucosa preceding the formation of peptic ulcer, hypermotility and hypersecretion in the large bowel preceding ulcerative colitis, arteriolar spasm with functional hypertension preceding arteriolar sclerosis, functional hyperactivity of the thyroid gland preceding hyperplasia of the glandular tissue. During the stage of functional excitation of an organ system, the process is theoretically reversible and will respond to psychotherapy if the psychic deviation can be identified and corrected.

This brings us to a consideration of the problem of identifying and correcting psychic deviations, which problem is the basis of psychosomatic diagnosis and treatment. The first question is "when should we suspect a functional disability?" Many diagnoses of functional disability are made by exclusion, *i.e.*, when the symptoms fail qualitatively or quantitatively to correspond to objective findings or to meet known diagnostic criteria. However, the tendency to make a diagnosis of a functional disorder merely on the absence of positive organic findings is to be deplored. Intelligent search will reveal not only the absence of primary organic findings but also bring to light positive symptoms of a psychopathological process. It must be remembered that functional psychiatric disorders are clearly defined syndromes with distinctive, inter-related, predictable and categorical groups of symptoms; and a diagnosis of psychosomatic disorder should be made upon these positive signs and symptoms.

The human personality can be thought of as possessing a structure in much the same sense as the various organs of the body are structured, and in psychiatric terminology the term "neurotic structure" is used. In the neurotic structure one sees evidences of emotional immaturity, impulsivity, dependency, egocentricity, sensitivity to the

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opinions of others, perfectionism, inadequacy feelings, poorly channeled drives, erratic behavior, emotional instability, contentiousness, marked introspection, and a need to impress listeners with the seriousness of a wide variety of symptoms and signs that are important only to the individual presenting them. If a patient presents himself with a somatic disorder and upon analysis of his personality the physician finds that it has a neurotic structure, one should immediately begin to search for a psychosomatic formulation. If a psychosomatic formulation can be arrived at, psychotherapy should be the cornerstone of treatment, drug administration used only as an adjunct, and surgery as a last resort only when the somatic changes have reached the stage of irreversibility. In these times it is no longer necessary to emphasize the wisdom of avoiding surgical procedures on a neurotic patient. Today the comparative rarity of the once notorious "checkerboard abdomen" redounds to the perspicacity of the modern surgeon. In the early years of my experience as a psychiatrist, too many patients with somatic complaints which were psychic in origin came to me with both old and recent surgical scars on their abdomen and neck. Thanks to psychosomatic diagnosis and an appreciation by the medical profession at large of its vital importance, such multi-scarred patients are seen with an infrequency that is refreshing.

In order to arrive at a diagnosis of a psychosomatic disorder, the history of the patient as well as that of the patient's illness is of first importance. Dunbar[1] states that most errors in diagnosis, as well as in the treatment program, have a basis in the medical history itself, so that the first problem becomes a procedure for what we have called a "psychosomatic history." This means that the physician should not be content with merely a history of the "present illness" *per se*. It is not enough to start the history with the time of the first appearance of the symptoms which caused the patient to seek relief, for by the time the physical manifestations of his disorder have come to the patient's attention the psychic factors which engendered those manifestations must have been in operation for months or years. In all of our histories we must place special emphasis on the significance of the early life of the patient. "Emotional infancy is largely psychosomatic infancy."[2] The psychosomatic patient carries some of his basic reactions of infancy along through the years. In fact, successful treatment is more or less directly proportional to the degree of emotional immaturity of the patient, and to the degree to which the causative factors are on a conscious (ego neurosis) or unconscious (characer neurosis) level. If the causative factors (anxiety, hostility, conflict) are on the conscious level and are modifiable either through manipulation of the patient's environment or through a modification of his mental adjustment with resulting equilibrium in the organism-environment continuum, the psychosomatic problem may be solved without the aid of a trained psychiatrist. On the other hand, in the case of a character neurosis where the conflicts lie deep in the unconscious levels of the personality, the problem cannot be mastered until these conflicts are resolved by a formal psychiatric investigation of the dynamisms involved. In the deeper neuroses the parent situation and its contribution to the superego is of singular importance. The nature of the parental code often decides the fate of a child's later modes of adjustment. The parent's attitude toward himself, the other parent, illness and health, want and plenty, social mores, right and wrong, politics and religion, and sex, all have a profound effect on the character development of a child. Of tremendous importance, too, is the psychosexual development of the individual for this plays a remarkably significant part in many psychosomatic symptoms. However, I do not hold with those who believe that all vital energy (libido) is sexual in nature.

We see, then, that the psychosomatic history must contain much more information than is given in an ordinary medical history. In a medical history the age and the cause of death of the parents is routinely noted down. However, from a psychosomatic standpoint it becomes important to know the age of the patient at the time of the parent's death, the emotional impact suffered by the patient, how great was the threat to the patient's emotional and physical security, the degree and manner in which the patient could depend upon the surviving parent or siblings or other relations, the amount of repression or over-reaction shown by the patient, and the nature and duration of the grief reaction if there was one. Moreover, it is important to know whether the patient was in contact with his parents during much or little of his life, and whether he nursed one or the other of them during the terminal illness. Following this, one must obtain an account of the patient's life in which his important environmental stresses are outlined, including his psychological and physiological reactions to them. This is best brought out by having the patient give a chronological biographical account of himself in the form of a conversational interview. Such questions as "what kind of a childhood did you have?" "Were you a happy child?" "Tell me something of the important things that you remember about your childhood," should be asked; also questions about the patient's attitude toward, and relations with, his earlier playmates, his adjustment to school, reactions to his teachers, how he felt when he got up to recite, whether he was bashful or self-conscious, his favorite subjects in class, whether he enjoyed games and what kind of games he played. Thus, one frequently can tell whether one is dealing with a personality that is well adjusted and adequate, or if it was beset by emotional conflicts and maladjustments. If the patient's life story runs along smoothly until a certain age is reached and then disturbing experiences and inappropriate reactions came into the picture, the examiner would do well to pause at this stage of the narrative and inquire carefully about *all* of the details germane to this part of the patient's life span. Here one must pay special attention to the topics that the patient tends to avoid or misrepresent, and also topics that are accompanied by an increase in his vegetative responses (blushing, sweating, eructation, palpitation, and the like) or by disturbances in emotivity (usually crying, but sometimes also anger or embarrassment). One of the rules in psychiatric anamnesis is that the very subjects which the patient prefers *not* to discuss are the most important. Frequently when asked about a parental attitude, an early love affair, or a sexual experience, the patient will say "I would rather not discuss that" or "that has nothing to do with my trouble." Immediately he must be assured that his very unwillingness to discuss that particular subject makes that subject doubly important, and that if he is going to conceal anything from the physician he cannot expect much help. Sometimes it is advisable to leave the subject for a while, discuss other matters, and then return to the one in question either later in the same interview or subsequently. The patient must be made to realize that the physician wants the information, not to satisfy his idle curiosity, but to assist him in evaluating all of the factors which may have a part in the dynamics of the illness from which the patient is suffering.

Many times I leave out from its chronological context the patient's story of his psychosexual development and reserve it for one of the last interviews. That is, unless the patient volunteers information about his sex life. Quite a few patients are very sensitive on sexual matters, and many think that the doctor is trying to pry into their "private affairs." Therefore, with such a patient it is better to wait until he has told the rest of his story and is better acquainted with the examiner. Discrimination and judgment must be used in deciding when it is best to enter into a discussion of the most intimate aspects of a patient's life situation.

In obtaining a history of the "present illness" itself, careful attention must be paid to the events *preceding* the appearance of the first symptom. It is not enough merely to ask "did you suffer any shock or were you under any particular mental strain for a considerable time before your trouble began?" Too frequently the patient will say that he was not, when, in reality, he was running a gamut of emotional traumata. Either these traumata were so painful that he repressed the memory of them, or he does not yet have sufficient confidence in the physician to reveal them. Moreover, he might be laboring under the mistaken notion that he has an organic somatic lesion and that his emotional experiences do not have anything to do with it. This is where close observation of the patient during the questioning is helpful. While denying the occurrence of any emotional experiences, he may betray himself by blushing, sweating, stirring uneasily in his chair, or by a sudden change in his attitude or tone of voice, by hostility, or by an embarrassed pause. At this point the examiner must decide whether he should pursue the inquiry further or defer it until the patient has become desensitized.

After the history of the "present illness" is obtained, a complete physical and neurological examination should be performed, including all the necessary laboratory tests. Many times the physician neglects to do this and, in so doing, misses an important psychotherapeutic weapon. It does not do any good to tell a patient that he is suffering from a "functional" disorder if the examinations and tests necessary to rule out an organic disorder have not been made. The more certain the physician is that a patient has a functional condition, the more painstaking should be the examination of his physical condition. On the other hand, it is also possible to perform too many examinations and to repeat them with sufficient frequency to be detrimental to the patient. In most cases one careful, thorough, and complete set of examinations is enough. In a few cases, especially if there is a doubt about some of the findings, re-examinations are necessary. However, unless absolutely indicated, the re-examinations are to be avoided because they tend to fix the patient's attention on the somatic aspect of his disorder and to over-emphasize the physical symptoms at the expense of the more important psychic dynamisms. A patient who is tense and nervous may, if she has been subjected to numerous basal metabolic rate determinations, be convinced that she has a toxic goiter. The patient with a syphilophobia may have his fear of syphilis reinforced by frequent blood Wassermann tests and examinations of his cerebral spinal fluid, especially if performed serially by successive physicians. A patient with a cardiac neurosis may feel that his worst suspicions have been confirmed if he is asked to have numerous electrocardiograms taken. The same goes for too many roentgenograms of the gastro-intestinal tract, urograms, cystoscopic examinations, and the like. We speak of "iatrogenic" disorders, *i.e.*, symptoms induced in the patient by either too much treatment or too many examinations by the physician.

In many cases, even after a psychosomatic history is obtained and a complete physical examination has been performed, there exists a doubt in the mind of a physician whether the disease in question is primarily psychosomatic in origin or whether it is somatopsychic. Naturally the answer to this question makes all the difference in the world when it comes to planning our therapeutic approach. In such cases it becomes necessary to use special aids in psychiatric diagnosis and in this connection I wish to mention briefly two such aids, the Minnesota Multiphasic Personality Profile, and the Rorschach test. The former is a simple self-administering test which can be used by any practitioner, and the latter is a much more complicated and highly specialized technique which is useful only when administered by a psychiatrist or psychologist trained in Rorschach methods.

The Minnesota Multiphasic Personality Profile,[3,4] is designed to assay the strength of various psychiatrically significant personality traits. It consists of a box of 550 cards on each of which is printed a statement, usually in the first person singular. The content of the items refers to the categories of the subject's general health, neurological and other bodily systems, habits, family and marital relationships and occupational, religious, social and sexual attitudes; certain items are also designed to disclose his mood, obsessive, compulsive, and phobic ideas, delusions, hallucinations and illusions, sadistic and masochistic trends, and morale. The test thus covers the topics which ordinarily would be inquired into during a detailed psychiatric interview. It is simply administered and scored. The manual provided gives complete details for use of the inventory.[5] The patient is supplied with a box of cards and requested to sort them into one of three categories, namely, "True," "False," or "Cannot Say," accordingly as the items apply directly to him. He will require from thirty minutes to several hours for completion of the test, depending on his intelligence and the presence of psychotic reactions, such as psychomotor retardation. In the presence of a psychosis with severe disturbances of the thought processes (acute mania or delirium, for example) the test cannot be satisfactorily applied. No supervision is required other than routine caution and observation so that the patient receives no guidance from others in sorting the items. After the patient has segregated all the cards, the answers are recorded on a simple record blank, and transparent templates are used to obtain the various scores. Twenty to twenty-five minutes are usually required for the recording and scoring of a test. The final scores are in standard form and are plotted on a chart so as to provide a profile of the strength of the several traits. At present, the scores obtained are for hypochondriasis, depression, hysteria, psychopathic personality of the amoral type, masculinity-femininity of interests, paranoia, psychasthenia and schizophrenia. Hypomania has been recently added to this group. According to Leverenz[6] the test helps materially in disclosing the probable contribution of neurotic components in disturbances that have finally proved to be complex psychosomatic syndromes. At one time this may mean that surgical intervention and the more radical procedures are to be avoided, whereas at another time it may result in unusually early recognition of an organic disorder through the presence of a normal profile and the consequent improbability of a neurotic basis for the complaint.

I have used this test in a considerable number of cases and am convinced of its validity and usefulness. Furthermore, it has the virtues of simplicity, ease of administration, and economy of both time and expense. The actual scoring can be done by any intelligent office secretary after a few hours study and instruction, and when the profile is finished the clinician has a category of the patient's various personality disturbances as well as a measure of their severity. Thus, the test is of assistance in evaluating borderline conditions and the mixtures of psychotic and psychoneurotic elements, on which definite decisions may otherwise be difficult to make. If the profile is abnormal one can be pretty sure that psychic deviations are playing an important part in the clinical picture. If, on the other hand, the profile is normal the patient may still be suffering from a psychosomatic disorder. That is a weakness of the test. It is not as sensitive as the Rorschach and many patients with normal Multiphasic Personality Profiles show in the latter test a definite psychosomatic formulation.

The Rorschach test,[7,8] gives us the underlying mental and emotional frame of reference according to which an individual interprets his environment and reacts to it. Dunbar[1] says "it probes beneath the observable behavior, conversation and mannerisms to deep-lying, often unconscious, feelings and motives. The psychosomatic examination usually gives more clearly the specific people and situations in a person's life which occupy his attention; arouses interest, love, anxiety, fear, and the like. The Rorschach test shows the extent to which his interpretations of this external reality are rational and objective, or distorted and erroneous because of past conditioning. The test distinguishes between superficial shock reactions and the more deep-seated characteristic reaction patterns. It gives some indication of whether a symptom or illness represents a wholesale solution of most of life's problems or just a temporary expedient in dealing with a specific problem." The test is administered by having the patient look at ten standard cards on each of which is an ink blot. Each ink blot in itself has minimal conventionalized meanings, so the patient's responses to the blots actually represent functions of his own personality. With this test we obtain a three dimensional view of the patient's personality (psychogram) which is not possible with the Multiphasic test. Furthermore, with the Rorschach it is possible to detect nuances in personality functioning that cannot be delineated by simpler methods. Many times the Rorschach will reveal personality traits and point to sources of conflict material which otherwise could be found only through long and expensive hours of psychoanalysis. Many critics of the test allege that it is too time-consuming and too highly technical to be used generally. True, to become a Rorschach adept requires months of training and experience but it need not necessarily follow that the test is not a valuable one when administered and interpreted by someone who understands it and is trained in the Rorschach technique. Pragmatically, if the test is useful and helps to unravel many of the complex diagnostic problems involved in psychosomatics, it is a valuable adjunct and should be used wherever indicated. If the Rorschach analysis of a patient follows the "psychosomatic formula,"[9] our therapeutic efforts should be directed primarily toward unravelling the quirks in the patient's psyche as revealed by the analysis. If, on the other hand, the Rorschach does not reveal any significant personality deviations, the physician should interest himself primarily in the somatic aspects of the disease and not spend too many hours searching for psychogenic factors which either do not exist or are of little clinical significance. To illustrate how the Rorschach is helpful in this regard, I will cite two cases. Both were referred to me by Dr. Herman J. Wolff of St. Paul.

Case 1. F. J. was a boy fifteen years old who was suffering from severe bronchial asthma. There was no family history of allergy. Both parents and two siblings of which F. was the second were living and well and there were no dead siblings. The father was a successful businessman, never paid much attention to family problems, and had an unsympathetic attitude toward the patient's illness. The mother was an attractive, dynamic, but somewhat vain woman who assumed a strongly protective attitude toward F. Many thought that she "babied" him. Because of his asthma it was necessary for F. to be on a very strict diet, and he also lived in a specially constructed air-conditioned room which had been built for him in the family home. The only relief that F ever obtained during an asthmatic attack was from adrenalin which was given hypodermically *always by the mother.* It seemed that the mother was a very important personality in the dynamics of F.'s illness.

During the past few years patient had been sent to a school in a warm dry climate, and at the school he had many adjustment difficulties and much asthma. His mother made numerous trips to the school (1500 miles from home) in order both to "get things straightened out" and also seemingly to satisfy her own emotional need to maintain a supervisory and protective attitude toward F. The father frequently expressed the opinion that the mother was too "soft" with the patient and felt that the boy should be handled along lines that were more hard boiled. The parents often quarrelled over the management of F.'s asthma, the mother taking the boy's part.

F. himself was a pleasant, intelligent, nice appearing lad who made a good impression. He was slightly effeminate and his chief interests were art and music. He had some talent as a painter but never showed any interest in the more virile pastimes such as hunting, fishing, or athletics. He did not seem to exhibit any undue fear or concern about his affliction except that it restricted his activities. He took his asthma more or less for granted but was anxious to have something done to relieve it. The question in our minds was how much was the asthma an expression of F.'s need to be dominated and cared for by his mother? Were the attacks a weapon which he was unconsciously using against his father, or a device to get attention from his mother, or the expression of some psychosexual conflict? The psychosomatic history was suggestive but not conclusive, so it was decided to take the patient's personality profile. Aside from some increase in the femininity score the profile was within normal limits. As I stated before, this does not rule out a psychosomatic disorder so it was decided to make a Rorschach analysis.

The Rorschach showed a sound ego structure but signs that F. was not functioning at the level of his personality. He showed the emotional irritability and instability usually seen in the adolescent and also evidences of mild neurosis. However, there was no deep anxiety, the phantasy life was robust and healthy, and there was no evidences of excessive introversion or extraversion. Associations were broad and free and the personality was well integrated and liberated. Our conclusion was that the Rorschach did not follow the psychosomatic formula and Doctor Wolff was advised to direct his efforts toward the offending allergens and other medical considerations inherent in the problem. Latest reports indicate that F is responding very satisfactorily to medical treatment. On the basis of our Rorschach findings and on the basis of F.'s response to medical treatment, psychotherapy in this case would have been a waste of time.

Case 2. Mrs. A. O. was an attractive white woman thirty-one years of age. She was referred for a psychiatric survey because she was nervous and still complaining of abdominal pain in spite of several major operations performed in an effort to relieve it. All of the physical examinations and laboratory tests carried out by Doctor Wolff had given normal findings. Without going into the details of Mrs. O.'s history, but in order to give an idea of the surgical traumata that she had endured, the following points will be noted. Mrs. O. had a tonsillectomy in 1930 and this was uneventful. She married in 1933. In 1934 she became pregnant and she stated that this pregnancy "was a burden." She vomited throughout the entire pregnancy, delivery was accomplished only with the aid of high forceps, and Mrs. O. had extensive perineal lacerations. She again became pregnant early in 1936 and all through this pregnancy Mrs. O. had excessive nausea and vomiting, backache, and urinary tract infection. She was anxious and tense and at the seventh month was threatened with a miscarriage. However, the pregnancy went to term and delivery was uneventful. Following the puerperium Mrs. O. developed severe abdominal pain which she was told was "due to her tubes." However, she could not stand surgery so went to stay with her parents in Florida. Finally in the fall of 1939 a pelvic laparotomy was performed and all of her organs were found to be in good condition with the exception of the appendix which appeared to be chronically inflamed. The appendix was removed without any relief of the patient's abdominal pain. Following the operation Mrs. O. never felt well. Her husband became disgusted with her and for the following five years Mrs. O. was a very unhappy woman. She was depressed, nervous, and jumpy. She again became pregnant in February 1944 and soon she began to have severe abdominal and right flank pain, chills, and fever up to 103° F. In May 1944 a nephropexy was performed and following this patient was in bed for several weeks because of burning urination, alternating constipation and diarrhea, vomiting, and severe abdominal pain. Another physician then made a diagnosis of gastric ulcer and kept Mrs. O. under hospital management for several weeks during which time she got worse. It was subsequently found that there was no free hydrochloric acid in her stomach. In July 1944 she was operated upon for a ruptured ectopic pregnancy and following this the abdominal pain became worse and persistent. She then became depressed, had daily crying spells, was worse in the morning, lost interest in everything, and bought a piece of rope with which she planned to hang herself. She consulted Doctor Wolff who, after ruling out serious organic disease, referred her to me for a psychiatric survey. Our question was: is this condition somato-psychic or is it psychosomatic?

The personality profile showed a slight increase in the scores for hypochondriasis and depression. This told us something that we already knew so it was decided to make a Rorschach analysis. In this case, the psychosomatic formula was much in evidence. It showed signs of severe emotional stress, strenuous inner conflict, neurotic behavior, deep anxiety, and emotional immaturity. However, the ego was sufficiently strong to prevent the patient from seeking escape by way of a psychosis. This is what we usually see in the psychosomatic formula. Furthermore, the associational content in this case revealed the nature and origin of the conflicts, many of which centered around the patient's mother. It is interesting to note that during the giving of her psychosomatic history, Mrs. O. insisted that she always had admired her mother, that the mother was an ideal person who liked people, liked to entertain, was affectionate, got along well with her husband, and "lived for her home and family." It was only after the Rorschach interpretation had been discussed with Mrs. O. and she was asked to try to think of any disturbing reaction that she might have had to her mother that the *true* story came out. Although the mother was a very pleasant and gracious person to her friends and acquaintances, she was in reality a chronic surgical invalid. She had a martyr complex. In addition to this she was tremendously overweight, a state of affairs which Mrs. O. deplored and passionately wanted to avoid. The mother also had an enormous ventral hernia, she suffered from indigestion, constipation and hemorrhoids, and her health was a constant subject of conversation ever since Mrs. O. could remember. Time and space will not permit a full description of the psychological implications of the mother-daughter relationship, but suffice to say this important therapeutic lead which was uncovered by the Rorschach analysis led the way to our psychotherapeutic approach. Mrs. O. was seen for three hours a week for four weeks and when she left for her home town she felt very much better. Several letters from her indicated continued improvement after her return home. Two weeks ago she reported in person and stated that she was entirely free from pain, had gained weight, was active socially and she enjoyed life.

This was a case in which, on the basis of the psychosomatic history alone and without special psychiatric investigation, we would have been unable to tell whether the patient's pain was psychogenic or whether she still had some organic somatic disturbance which was reflecting itself in the psyche as a mental depression. On the basis of the Rorschach diagnosis psychotherapy was instituted and the patient was relieved of all of her physical and mental symptoms. In Case 1 psychotherapy would have been to no avail. In Case 2 it brought results that were eminently gratifying to the patient and, incidentally to the physician.

CONCLUSIONS

1. The validity of the psychosomatic concept is now well established.

2. A distinction must be made between diseases that are psychosomatic in origin and those that are somatopsychic.

3. Psychotherapy is a necessary and effective treatment in the psychosomatic disorders, while in the somatopsychic diseases therapeutic efforts should be directed primarily toward the organic substratum.

4. The "psychosomatic history" is of first importance in psychosomatic diagnosis. It is much more comprehensive and includes many more details about the patient's early life and life experiences than is included in the ordinary medical history.

5. In most cases the psychiatric survey (including the psychosomatic history) will decide whether the patient will respond to psychotherapy.

6. The Minnesota Multiphasic Personality Profile and the Rorschach test are useful and sometimes necessary procedures in making a psychosomatic diagnosis.

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PRESCRIBING PHYSICAL MEDICINE

(Continued from page 101)

used for the purpose of strengthening the muscle. The amount of resistance and the number of repetitions are important relative to the rapidity with which strength of the muscle is restored.

It has been pointed out recently that muscular exercise can be classified according to the effect produced; namely, power, speed, endurance and co-ordination. Delorme[4] has expressed the opinion that exercise of low resistance, such as bicycle riding or lifting light sand bags or weights, given in a high number of repetitions, produces endurance rather than power. Fatigue was due not so much to overcoming resistance as to the sheer number of repetitions. Delorme concluded that low resistance used for a small number of repetitions is not significant in increasing power or endurance. Its only value is to increase joint motion. Therefore, he used greater resistance and a few repetitions.

In prescribing active resistive exercises, a definite length of time for the exercises to be done, the weight to be lifted and resistance to be applied should all be specified; the time and energy to be used should be increased gradually.

Comment. Undoubtedly none of the active exercises used for therapeutic purposes are given for sufficient length of time to obtain the maximal benefit. It is probable that if more time were spent each day in performing these exercises they would be of greater value. There is a tendency to spend considerable time on heat and massage and relatively little time on exercise. Therapeutic exercise undoubtedly is relatively more important than some of the other physical agents in the treatment of many conditions. However, it must be prescribed adequately and carefully.

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◀ MINNEAPOLIS VETERANS ADMINISTRATION HOSPITAL ▶

STAFF SEMINAR

Tumors of the Parotid

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TUMORS of the parotid gland, or more accurately, tumors of the parotid region, since their origin from the gland is a matter of debate, have long presented a complicated and confused picture both from a histological and a clinical standpoint. There is wide variance of opinion as to the significance of the pathological picture presented by these growths, and also as to the clinical course of these tumors. The tendency has been in the past to evaluate them using the usual criteria for tumors in general, but it is evident that these growths, especially mixed tumors, do not follow the usual behavior pattern of the ordinary neoplasms, and therefore probably should be considered as an entirely separate entity.

ETIOLOGY OF PAROTID TUMORS

Before attempting a classification of the new growths occurring in the region of the parotid, some consideration should be given to the theories of their origin. Since the so-called mixed tumors comprise about 90 per cent of the new growths found in this area it is with these that we are primarily concerned — other neoplasms following pretty well the accepted pattern for their counterparts in other regions.

To Kaltschmied (1752) is usually given the credit for recognizing these (mixed) tumors, but they attracted little attention until the work of Paget in 1853 stimulated investigation as to their possible origin. Virchow in 1863 also described them and spoke of them as "enchondromas" or "diffuse enchondromas," believing them to be of mesoblastic connective tissue origin, but was at somewhat of a loss to explain the frequent occurrence of cartilage, which he did rather hesitatingly by attributing it to the capsule of the tumor as a product of the capsule. In 1879 Wartmann attributed an endothelial origin to the growths, supported in this by Volkmann who explained the presence of cartilage and other elements through the "unlimited reproductive and metaplastic versatility of the endothelium." These papers produced such a profound impression that the tumors were known as endotheliomas until about 1899 when Hinsberg and Borrmann through their writings cast doubt upon the endothelial origin.

Krompecher (1908) believed that mixed tumors should be included among those arising from basal cells of the stratified squamous epithelium, and renamed them "basaliomas." In 1906 Ehrlich described mucoid degeneration of the epithelial cells of salivary gland tumors with subsequent condensation, inspissation and chemical transformation resulting in cartilage, now no longer regarded as cartilage, but as chondroid. This explanation, still acceptable, accounts for the presence of "cartilage" (chondroid) in these salivary tumors. However, the fact that the pancreas, closely allied to the salivary glands, and spoken of as the "abdominal salivary gland" is apparently exempt from these growths suggests that other factors in their origin operate, thus giving rise to the embryonal rest theory of origin, which is accepted by many today.

In contrast to the mass of speculative and theoretical evidence supporting the various theories, there has been some experimental work done by Hemplemann and Womack [15] who carried out a histochemical investigation of the mucoids of mixed tumors. Their method of study was by chemical investigation of the mucoid material in the parenchyma and stroma, carried out by variations in staining properties in fixed tissue sections. From their investigation they conclude that mucus of both mesenchymal and epithelial origins is found, and suggest that this is evidence of the tumors being the "result of primary epithelial maldevelopment with mesodermal differentiation secondary to this epithelial disturbance." This same explanation is used to account for the histologic picture of teratomas, and they feel is evidence of the embryologic origin of these parotid tumors.

Conheim in 1877 expressed his "embryonal vestiges" theory, and this has been used by some (Cuneo, Veau, Forgue, Massabeau) who attributed the development of these growths to inclusion of embryonal material in close relationship with the development of the branchial arches. Chevassu believed that mixed tumors may arise in at least four different ways: (a) From the tissue of a salivary gland, (b) from its embryonal glandular rudiments, (c) from branchial arches, (d) from embryonal material of the salivary glands in the branchial arches.

At the present time there are two prevailing theories of origin, which may be expressed as follows:

I. Single Tissue Origin

(a) From epithelium of salivary or mucus glands (evidence given in support of this by Fraser [12] who claimed experimental development of these tumors in dogs and concluded that they arose from the epithelium of the ducts, and that trauma was a factor in development); (b) From detached salivary gland anlage.

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II. Dual Tissue Origin

(a) From branchial cleft inclusions; (b) From embryonal non-branchial anlage (ectoderm and mesenchyme).

Statistically, trauma does not seem to play a role in the etiology of mixed tumors, although isolated cases give such a history. Infection such as mumps, or familial tendency apparently has no bearing on the occurrence. of these growths.

CLASSIFICATION

I. Benign

(a) Angiomas, (b) Lipomas, (c) Fibromas, (d) Adenolymphoma (Warthin's tumor) (onkocytoma) (papillary cystadenoma lymphomatosum); (e) Adenoma — there is some question as to the occurrence of adenomas. It is likely that those isolated cases reported in the literature do not represent true adenomas, but rather are mixed tumors that have the characteristics of adenomas.

II. Malignant

(a) Adenocarcinoma (papillary, epidermoid, cylindroma type), (b) Cuboidal cell carcinoma, (c) Small cell carcinoma, (d) Sarcoma (fibrasarcoma).

III. Mixed Tumors

(a) Parenchymatous, (b) Interstitial.

The above classification is based largely upon histological considerations, yet not entirely so, for the mixed tumors then properly should be classified with the malignant growths, for such is their histological structure, yet clinically, for the most part, their behavior is benign. The division of mixed tumors into two simple groups, rather than the complicated classification usually presented, calls for some explanation. In general, by mixed tumors (of the parotid) are meant benign growths of varying histological structure, distinct from carcinoma or sarcoma but it is recognized (McFarland[30]) that upon microscopic examination of any series of so-called mixed tumors it is impossible to tell with any degree of certainty which of the tumors will recur, and an accurate prognosis is impossible in any given case. Histologically, it is well known and agreed that the tumors present such a variety of appearance as to make classification almost an impossibility. Broadly speaking, mixed tumors may be said to be composed of parenchymatous and interstitial tissues, but at that point accurate definition and classification ceases because of the extreme variability of the tumor structure, this variability being dependent upon the proportion of various interstitial and parenchymatous elements. This division into interstitial and parenchymatous types has also a clinical application, in that the former are three times as frequent as the latter, and have been shown statistically to recur less frequently.

For practical purposes it is probably sufficient to remember that these mixed tumors have an extremely variable histologic structure which may have partial basis on morphological variations of cells of the same type rather than a multiplicity of cell types. This multiplicity has led them to be classified by diffierent pathologists as chondromas, sarcomas, myxomas, enclavomas, branchimas, adenomas, adenocarcinomas, carcinomas, or sarcomas, depending upon their belief as to the theory of origin.

PATHOLOGY

I. Benign Tumors

The only frankly benign tumors occurring with sufficient frequency to warrant their description are the adenolymphomas, sometimes called Warthin's tumor or papillarycystadenoma lymphomatosum. Pathologically these are lobulated, smooth, spherical or ovoid, encapsulated, or, rarely, infiltrative. On cut section these show cystic areas, and microscopically have a lymphoid stroma with germinal centers. There are many cysts lined with a double layer of epithelium (tall cylindrical cells) and many of the cysts have papillary projections. The origin of these benign growths may be branchiogenic, but by some they are thought to be blending of lymphoid tissue of the preauricular lymph node with the parotid lobule occurring in fetal life. These are the only parotid tumors having a predilection for sex, being more common in males, a ratio of five or six to one.

II. Malignant

In general, the malignant tumors are the primary carcinomas and less frequently sarcomas, and those recurrent malignant tumors which apparently started as mixed tumors, were removed, and then recurred exhibiting truly malignant characteristics. Carcinomas usually are rapidly growing, and although at first capsulated, soon invade the gland, capsule, regional nodes and give rise to local and general metastases. Histologically these tumors show dark staining nuclei with marked infiltrative tendency demonstrated, in that the capsule, surrounding parotid substance and fat are invaded.

Following the removal of a mixed tumor a recurrence may show frankly carcinomatous or sarcomatous changes. Because of the variable histological picture of mixed tumor, authorities do not agree as to metaplasia occurring in mixed tumors, some being of the opinion that malignant recurrences do not represent metaplasia, but that in the process of sectioning the original tumor the malignant area was overlooked, others taking the opposite extreme view that all mixed tumors are malignant, but slow in development. To these latter, recurrences are the expected outcome, and absence of recurrence only means that the tumor was removed early enough and completely enough. Occasionally, too, a parotid tumor may be apparently benign, with slow growth over a period of 20 to 30 years, then suddenly undergo rapid change manifested by rapid increase in size, pain, invasion and metastases, and in these cases squamous cell epithelioma or spindle cell sarcoma is found superimposed on what seems to be a mixed tumor. This event is rare, and there are those who deny its existence.

III. Mixed Tumors

Grossly these tumors present a rounded or lobulated appearance, are encapsulated (although the capsule may in some cases be rather thin) and are rarely infiltrative. Their consistency is firm, occasionally cystic, and may be almost cartilaginous. Microscopically, their structure is varied and mixed, but may be said to contain the following constituents in varying proportion: (1) Strands of epithelial cells that may show a glandular arrangement. These strands may be broad or flattened. (2) Anastomosing cords of small dark epithelial cells with hyperchromatic nuclei. (3) Mucoid connective tissue. (4) Cartilage, or chondroid (mucinous connective tissue produced by mucin secreting cells). (5) Lymphoid tissue areas. (6) Sometimes osteogenic structures.

Any of the above types may predominate—sometimes the cells are actively secreting. From few to many mitotic figures may be seen, and many of the tumors are very vascular, and judging by the usual criteria of malignancy, would appear histologically to be malignant.

These mixed tumors may, in some instance, be locally invasive, even causing erosion of bone, but spontaneous malignant change is very rare.

Since the so-called mixed tumors represent approximately 90 per cent of all new growths occurring in the region of the gland, they merit further consideration before taking up the subject of diagnosis and treatment of parotid growths in general.

The question as to malignancy of mixed tumors is, as yet, not settled, there being wide divergencey of opinion. Any tumor may, upon occasion, prove fatal, but generally the term malignant is restricted to tumors which exhibit certain deleterious effects upon the host, the most important of these features being. (1) infiltrative growth, (2) local destructive properties, (3) recurrence after removal, (4) formation of metatsases, (5) local interference with function and (6) general toxic action of absorbed tumor products.

Taking these up in the order given, we find:

1. *Infiltrative Growth*:

Mixed tumors are usually definitely encapsulated and therefore rarely infiltrative. If, however, they are disturbed through trauma or by operative interference, and the capsule broken, infiltrative growth may take place. In the lobulated tumors which are in the majority, each lobule also has its definite capsule, while a general capsule surrounds the whole. Houck [16] in a series of tumors thought to be benign by both clinical and microscopic criteria, found that the capsule was invaded by epithelial elements in 28 per cent of his series. There is tendency for re-encapsulation of cells that break through the capsule, and the nodular structure so frequently seen may represent re-incapsulation of cells that have broken through the confines of the original capsule. This is probably an expression of potential malignancy, the balance between the invasive tendency of the cells and the encapsulating propery of the fibrous tissue of the host determining whether or not infiltration will occur. In cases that have invaded, this may extend into the orbit, thence to the cranial cavity, or in the other instances into the oral cavity. This invasion is rare and is usually found only after previous incomplete removal or biopsy has broken the capsule.

2. *Local Tissue Destruction*:

The location of these tumors, so situated that expansion is possible, resisted only by the elastic skin of the face, does not lead to destruction by pressure necrosis in many instances. In support of this are cited caes in the literature, of tumors that have attained the size of five, six or seven pounds, and Cotterhill's case that attained an estimated weight of 22 pounds and was twice as large as the patient's head. Pressure with pain or paralysis resulting from encroachment on the 5th or 7th nerve quite frequently occurs, but is more common in truly malignant lesions. Ulceration of the skin over the tumor, with hemorrhage, is not infrequent, especially after operative interference, as in biopsy, and cases in which the mandible or mastoid process has been eroded are reported. In this connection, the fact that the average duration of tumors prior to medical consultation is five to eight years, and, in some instances forty years, indicates the infrequency of pressure symptoms producing pain.

3. *Recurrence after Operative Removal*:

There is probably no accurate series reported in which recurrences are tabulated. This is due to a number of factors, such as difficulty in follow-up, but more importantly, because of the extended period of follow-up necessary. Five-year "cures" mean very little—the tumor may seemingly have been cured, but then recur, sometimes as long as forty-five years later. Therefore, the only complete follow-up must trace patients during their entire life, a study which no-one has yet done. The usual figure for recurrence is given as 25 per cent in the textbooks, and different writers give figures ranging from 4 to 50 per cent, the variations probably being due to the length of time their patients were followed, as well as to the classification used. If, as supposed, this tumor is benign, there must be some explanation for the recurrence. It is easy to say that recurrence is due to the incomplete removal of the original tumor, but when one considers that these tumors are encapsulated, although the capsule is occasionally thin, one would expect that the tumor would be completely excised in more than 75 per cent of cases. McFarland in his reported series of 413 cases studied from a pathological-clinical standpoint, makes the oservation that small tumors are more prone to recur than larger ones, and in fact suggests that the tumor should be allowed to "ripen" before it is excised. The higher recurrence rate in the small tumors he explains by the fact that, although the tumors are frequently unincentric, many of them are polycentric, with small clusters of adjacent tumor, sometimes pin-head in size, which easily may be missed before they have become incorporated into the main tumor mass. He also feels that in some cases of lobulation the lobules may become attached at a later date, and therefore may be missed at the original operation. Spilling part of the contents of the tumor capsule at the time of removal may occount for some of the immediate recurrences, and the long-delayed "recurrences" may possibly be explained on the development of secondary independent tumors. Another factor, more difficult to evaluate, may be variation in the type of tumor. Here, one is confronted by a confusing problem, since by their very nature all mixed tumors are widely different, and if significant variations predisposing to recurrence do occur, it should be possible to classify these varieties so that it may be predicted in advance which tumor will recur. This, however, does not appear to be the case, because histologic appearance does not seem to have any bearing on the incidence of recurrence. A possible exception to this is found in the classification of interstitial and parenchymatous groups, in which it was found that of recurrences, 40 per cent were of the interstitial type, to 60 per cent parenchymatous.

4. *Metastases*:

There is no agreement as to the frequency of metastases of mixed tumors, the general opinion being that distant metastases are so rare that their reported occurrence tends to cast doubt upon the diagnosis. In reviewing the literature, one finds a number of cited cases of distant metastases of a mixed tumor, proven at autopsy. Mulligan[32] reviews 20 cases of salivary tumor, with wide-spread metastases, in 12 of which the primary growth was in the parotid. He reports metastases to lung, pleura, liver, bones, lymph nodes, kidneys and spleen, but of his 20 cases, only 5 are probably definitely mixed tumors. However, there are reported cases of a mixed tumor metastasizing as such, not as carcinomatous or sarcomatous degeneration.

5. *Local Interference with Function*:

This is usually not of great importance save in the production of symptoms due to pressure on the 5th or 7th nerve. Occasionally large tumors may interfere with opening of the jaw, press on the external auditory meatus, or rarely press on a duct causing secondary cystic formation. However, when the tumor has been disturbed, and not completely excised, with the development of recurrence there may be profound interference with function and invasive action.

6. *General Toxic Action of Absorbed Tumor Products*:

No true tumor products may be attributed to these growths — secondary infection, ulceration, hemorrhage, etc., may occur, but the systemic effect thus produced has no relationship to the tumor.

INCIDENCE

Parotid tumors are not of frequent occurrence—Sistrunk[40] gives an incidence of 0.0626 per cent of admissions to the Mayo Clinic, and McFarland[30] says that they average 15 adimssions a year to Philadelphia hospitals (based on a 25 year survey).

AGE

Parotid tumors may occur at any age, from infancy to extreme old age, but benign tumors are more common before the age of forty and malignant lesions more common after the age of forty; there are notable variations from this general statement.

SEX

They are equally divided between the sexes, save for adenolymphomas, which are more common in males; ratio 5 or 6 to 1.

RIGHT OR LEFT

They are invariably unilateral, without preference as to side. Cysts occasionally are bilateral in location, but bilateral swelling is a diagnostic point tending to disprove parotid tumor as the diagnosis.

COLOR

Parotid tumors are distributed equally between white and colored peoples.

SIGNS, SYMPTOMS, AND DIFFERENTIAL DIAGNOSIS

A parotid tumor should be suspected in any patient with an enlargement within a radius of 4.5 cm. from the angle of the jaw. The diagnosis usually presents no particular difficulties (unless it is a mixed tumor of an aberrant gland). Differentiation between benign and malignant lesions is of the most importance, and in many instances this is not possible, but the following criteria sometimes are of aid:

I. Duration

The duration of the swelling before medical advice is sought is about seven years in the majority of the reported series of benign and mixed tumors. In malignant lesions, the average duration is considerably less, for these are more commonly associated with pain, thus the patient seeks aid at an earlier stage in the process. The average for carcinomata is four and one-half years, and for sarcomata six months.

II. Pain

By far the majority of mixed tumors are painless, the remaining few having some slight aching, sometimes more pronounced at night or on movement of the jaw. In malignancies, the pain may be sometimes severe, lancinating, unbearable radiating to the face, head, neck, jaw, eye and back of the ear, usually because of involvement of the 5th nerve. Some malignant lesions may be painless.

III. Size

This is variable. Most mixed tumors present from 10 to 20 years are said to be walnut-sized, while malignant tumors are much more rapidly growing.

IV. Contour

Mixed tumors and benign growths have, as a rule, well defined borders and project from the side of the cheek so as to cause more facial asymetry than the malignant tumors, which are usually more flattened and infiltrative.

V. Consistency

Many parotid tumors are hard because of the encapsulation. Extreme harness is described in frankly malignant lesions and in some mixed tumors, although a cystic soft consistency sometimes is an indication of malignant degeneration.

VI. Mobility

In mixed tumors this is usually present to some degree —they are often apparently fixed to the deeper structures, but not adherent to the overlying skin. Fixation is usually a sign of malignancy. From other lesions of the parotid area differentiation is usually not difficult, but for completeness the following may be mentioned:

(1) Enlarged lymph nodes, especially metastatic, as from carcinoma of the mouth or upper pharynx.
(2) Epidemic or suppurative parotitis.
(3) Syphilis }
(4) Tuberculosis } of the parotid
(5) Actinomycosis }
(6) Lipoma
(7) Branchial cysts
(8) Inflammatory lesions, as with calculi.
(9) Benign inflammatory lesion with lymphocytic infiltration resembling Mikulicz disease, but not accompanied by lacrymal involvement, or accompanied by leuco-

cytic changes elsewhere is an occasional finding.

(10) Hodgkin's disease, leucemic infiltration and other lymphoblastomas.

DIAGNOSIS

I. Physical Diagnosis

Usually not difficult, but differentiation between types may not be possible.

II. Biopsy

Biopsy of these tumors is mentioned, only to be condemned. Surgical excision is the treatment, regardless of type, and preliminary biopsy serves only to violate the capsule, with increased chance of spillage of tumor contents. Frozen section at the time of operation may be of aid in some questionable cases when the decision must be made whether or not a radical excision with sacrifice of the facial nerve is indicated.

III. Saliography

The X-ray visualization of the duct system following the injection of Stensen's duct with lipiodol is rarely indicated, but may be of aid in differentiating an occasional case of inflammatory lesion associated with obstruction.

TREATMENT

Regardless of the type of tumor, the treatment is primarily surgical excision save in those far advanced cases of malignant growth with extension where radiation is the only treatment possible. Because of the difficulty in telling on physical examination which of these tumors (especially when dealing with the mixed variety) will recur, early surgical removal of the entire growth with its capsule, unbroken if possible, is the treatment of choice. A possible exception to this general statement may be taken by McFarland whose series indicates a greater incidence of recurrence when small growths were removed, and who suggests that possibly surgical excision should be delayed in the early cases to allow the lobulation to become consolidated into the main mass, facilitating removal. This is merely speculative, and is at variance with accepted surgical principles in dealing with new growths in general. Speaking in a broad sense, the procedure used should be extensive enough to remove the entire growth, sacrificing the facial nerve, the external carotid artery and internal jugular vein, even the common carotid artery when necessary, but these procedures are usually necessary only when dealing with malignancies. Various surgical technics are used, but they all have for their purpose the removal of the entire growth with as little damage to important structures, and as little disfigurement as possible.

I. Operative Treatment

Recurrence is the menace of the parotid tumors, and the fate of the patient with a parotid lesion lies in the hands of the surgeon who operates upon him for the removal of the original growth. If this is incompletely done, recurrence is likely, and with recurrence there is increased likelihood of malignant change. Operative methods employed in the past have been: enucleation inside the capsule, enucleation outside the capsule, and enucleation within the capsule with subsequent removal of the capsule. These procedures in the light of the relatively high recurrence rate have probably been inadequate even for the markedly encapsulated tumors, it probably being necessary to remove the tumor with at least one-fourth inch of adjacent parotid gland. Hesitancy to do this may be based in part to fear of salivary fistulae, and to fear of injury to the facial nerve. The incidence of salivary fistulae in this type of procedure is slight, and occurs only when a large duct is divided—in this connection it is recalled that the lower pole of the parotid is removed unhesitatingly in block neck dissections without the production of a salivary fistula.

II. Radiation Treatment

It is now generally agreed that the majority of mixed tumors of the parotid are radio-resistant, radiation being purely palliative, and for use in the treatment of recurrences, and as a pre-and post-opeartive adjunct. There are those (Merritt [25]) and others who believe that mixed tumors are radiosensitive, and point to decrease in size (probably due to action on the epithelium) as proof of the point. Current opinion, though, is that mixed tumors are radioresistant to a variable degree, depending upon their structure, the more complex histologically being more resistant. Malignant tumors on the other hand are more radio-sensitive, the extremely undifferentiated types not infrequently being quite sensitive. There has been no standardization of radiation technics—good results reported in isolated instances, being probably due more to individual variations in the tumor treated, than to technic, because most of the reported cases are single cases or very small series not studied histologically or followed for a sufficient length of time.

Radiation therapy alone should be advised for inoperable tumors (usually malignant), for tumors occurring in people in whom, because of other conditions, surgery is contraindicated, and in obviously sensitive tumors, sensitivity proved by trial period of therapy.

III. Combined Surgical-Radiation Treatment

Surgical excision coupled with preoperative and postoperative radiation seems to have definite advantage in so far as reduction of the recurrence rate of mixed tumors. Ahlbom is a strong advocate of this combined surgical-radiation therapy for all tumors of the parotid, and has suggested a plan of combined treatment, as follows:

1. *Benign Tumors*:

(a) Preoperative Radiation: Attempts to reduce the vitality of tumor cells and therefore reduce the chance of recurrence. Also in some instances preoperative radiation facilitates the surgical procedure in that the density of the capsule is increased, and the tumor may be reduced in size. External radiation is indicated—interstitial radiation, or implant of needles is contraindicated because the aim is to keep an intact capsule. The tumor itself and an area 1 to 2 cm. on all sides should be irradiated fractionally, and the dose should not exceed that which will leave the skin practically normal from three to five weeks after irradiation. No more reaction than a slight moderate erythema should be tolerated.

The system of treatment should consist of a daily dose of 350 to 400 *r* for four to five successive days, a total of 1200 to 2000 *r* (filtered).

(b) Postoperative Radiation: Ahlbom considers this necessary in all but the rare case in which the tumor lies completely free from the gland, very easily enucleated, with removal of the capsule intact. In all other cases he places radium tubes within the cavity of the wound three or four days postoperatively, using one to four tubes depending on the size of the cavity, each tube of 25 mg. radium filtered to total equivalent of 3 mm. of lead. This method has the advantage of giving a heavy dose in the wall of the cavity itself, whereas the dose falls off as it passes into the outlying normal tissues. Schedule advocated by Ahlbom:

Treatment time—1 tube, 20 hours; 2 tubes, 15 hours; 4 tubes, 12 hours.

2. *Malignant Tumors*:

In these not only the tumor but the regional nodes should be irradiated, usually it being necessary to include the upper half of the neck on the involved side.

- Fairly radiosensitive:
    - Basal cell carcinoma
    - Papillary cystic carcinoma
    - Undifferentiated tumors
- Slightly radiosensitive:
    - Adenocarcinoma
    - Squamous cell carcinoma

(a) Preoperative Radiation: A total skin dose of 1200 to 2500 *r* over one to two weeks should be given. Radiation should stop short of dermatitis, with future surgery in mind.

(b) Postoperative Radiation: Placing radium in the wound is of no great value. External radiation for from two to six weeks in about the same dosage as preoperatively is advised. As a rule, additional series of radiation should be avoided, but the patient should be observed closely, and irradiation given if nodes appear. Small bits of tumor that persist may be given interstitial radiation.

Complications arising from use of radiation therapy are much the same as when radiation is used elsewhere, and include post-radiation necrosis, atrophic changes in the skin or deeper tissues, with dermatitis or ulcer. Atrophy of the salivary and mucous glands resulting in dryness of the mouth may occur. Facial paralysis may also follow heavy radiation.

ANATOMY

I. Parotid Gland

As usually described, the parotid varies in weight from 14 to 28 grams, and is situated upon the side of the face immediately below, and in front of the external ear. The gland is enclosed within a capsule continuous with the deep cervical fascia, which is densely adherent to it, and posteriorly the fascia is thickened forming the stylomandibular ligament which intervenes between the parotid and submaxillary gland. The gland proper may roughly be divided into two portions, an anterior superficial facial portion and a deep portion, the latter extending behind the ramus of the mandible under the mastoid process, and in relation with the internal and external carotid arteries, the internal jugular vein and the vagus and glossopharyngeal nerves. These two portions are connected by an isthmus which is variable in size, rarely absent. A detached portion of the gland is usually found lying upon the masseter above the parotid duct and below the zygomatic arch.

II. Relationships of the Parotid Gland

1. *Anterior Surface*:

Moulded on the posterior border of the ramus of the mandible, dipping for a short distance between the two pterygoid muscles.

2. *Posterior Surface*:

Abuts against the external auditory meatus, mastoid process, and anterior border of the sternocleidomastoid.

3. *Superficial Surface*:

Covered by itegument; the superficial fascia contains the facial branches of the great auricular nerve, some small lymph glands, and the capsule of the gland.

4. *Deep Surface*:

Extends inward by means of two processes, one of which lies on the digastricus, styloid process, and styloid group of muscles, and projects under the mastoid process and sternocleidomastoideus. (The relationships of the digastricus, styloid process and transverse process of the first cervical vertebra are useful landmarks in surgery upon the gland.) The other process is in front of the styloid and sometimes passes into the posterior part of the mandibular fossa behind the temporomandibular joint. The deep surface is in contact with the internal and external carotid arteries, the internal jugular vein, and the vagus and glossopharyngeal nerves. From the pharyngeal wall the gland is separated by loose connective tissue.

III. Parotid Duct

The duct is approximately 7 cm. long, begins in the anterior part of the gland from numerous small branches, and lies on the masseter muscle. At the anterior border of this muscle it turns medially to pierce the buccal fat pad and buccinator, thence angling obliquely forward between the buccinator and the mucus membrane of the mouth to open opposite the second upper molar. While crossing the masseter, it is joined by the duct from the accessory portion of the gland.

IV. Nerves

1. *Facial*:

Of extreme surgical importance is the relationship of the facial nerve, which is usually spoken of as running within the substance of the parotid and ramifying to form the parotid plexus, roughly divisible into (a) temporal, (b) zygomatic, (c) buccal, (d) mandibular, and (e) cervical branches, according to the distribution. Hamilton Bailey [3] has shown that usually the facial nerve does not run within the substance of the gland proper, but that the primary divisions (temporofacial and cervicofacial) embrace the isthmus and there break up into their branches which lie deep to the parotid upon the fascia over the masseter, thus the facial nerve occupies the position of the meat in the parotid sandwich. In this connection it is worthy of mention that most malignant lesions of the parotid involve only the lower one-half of the nerve or some of its branches, and sacrifice of this lower portion of the nerve is not followed by as serious paralysis and deformity of the face as following the severance of the temporal portion.

It is also worth remembering that when the head is draped and positioned for surgery, tilted somewhat backward and turned away from the operator, as is usually done, the relationship of the facial nerve is changed somewhat so that it runs more directly forward than is the case with the head in the mid-position. Also, the inframandibular division comes to lie posterior to and below the mandible instead of almost directly over it.

In the presence of a tumor of the parotid the nerve may also be displaced somewhat so as to lose its normal relationships.

At the exit from the stylomastoid foramen, the facial nerve gives off the following branches: (a) To the digastricus—to the posterior belly of the muscle and a filament to the glossopharyngeal; (b) To the stylohoid; (c) Posterior Auricular Nerve—this runs upward in front of the mastoid process where it communicates with the posterior branch of the great auricular nerve.

2. *Great Auricular Nerve*:

Ascends around the posterior border of the sternocleidomastoid, perforates the deep fascia and ascends beneath the platysma to the parotid where it divides into: (a) Anterior branch distributed to the skin over the parotid; (b) Posterior, supplying skin over the mastoid process and back of the auricle.

3. *Auriculotemporal (Branch of Trigeminal)*:

This runs medial to the neck of the mandible, then turns upward with the superficial temporal artery between the auricula and condyle of the mandible, under the parotid gland. At the posterior border of the masseter it communicates with the facial, and gives off small branches to the parotid gland (sensory).

V. Arteries

1. *External Carotid*:

In its upper portion lies deep in the substance of the parotid, in which location it is deep to the facial nerve and the junction of the temporal and internal maxillary veins, separated from the internal carotid at this level by an intervening portion of the gland.

2. *Posterior Auricular Branch*:

Is given off above the digastricus and stylohoideus opposite the styloid process, gives off some small branches to the gland and ascends between the cartilage of the ear and the mastoid process.

3. *Internal Maxillary Artery*:

(The larger of the two terminal branches of the external carotid which divides at about the mid-portion of the gland to form this and the superficial temporal artery.) The internal maxillary artery lies on the anterior aspect of the deep portion of the gland, turning forward deep to the neck of the mandible.

4. *Superficial Temporal Artery*:

The smaller of the terminal branches runs deep on the antero-medial aspect of the gland which is grooved to receive it, and gives off several small branches to the gland and the *transverse facial artery,* then continues upward deep to the gland, where it is crossed by temporal and zygomatic branches of the facial nerve.

5. *Transverse Facial Artery*:

Is given off from the superficial temporal deep to the gland, and then runs forward through the substance of the gland between the parotid duct and the zygomatic arch, in which location it gives off branches to the gland, parotid duct, and masseter muscle.

VI. Veins

The superficial temporal vein arises on the side and vertex of the skull, enters the gland superficial to the superficial temporal artery, and in this location is joined by the internal maxillary vein, a short venous trunk, to form the posterior facial vein, which runs within the gland superficial to the external carotid artery, but overlaid by the facial nerve. This vein splits into two divisions in the lower part of the gland: (a) Anterior Division, units with the anterior facial vein to form the common facial vein; (b) Posterior Division, unites in the gland with the posterior auricular, descending behind the auricula to form the external jugular, which commences at the angle of the mandible within the gland and runs down the neck in the direction of a line drawn from the angle of the mandible to the middle of the clavicle at the posterior border of the sternocleidomastoideus.

VII. Lymph Glands

The lymph glands of the parotid are divisible into two groups: (a) pre-auricular: Superficial to the parotid sheath, draining temporal and frontal areas of the scalp, outer portions of the lids and outer ear; (b) Parotid: Scattered throughout the gland substance, chiefly near its surface.

OPERATIVE CONSIDERATIONS

From a surgical standpoint there are three general types of tumor: (a) Tumors located below the lower pole of the gland, often free and movable, with a pedicle attached to the parotid fascia. This pedicle should be removed completely; (b) Tumors lying superficial to the gland; (c) Deep-lying tumors.

Common Technics

A number of technics have been advocated by different writers, and some of the most common will be briefly described. (Choice of incision also will depend on the size and location of the tumor.)

1. *Simple excision* done through an incision placed over the maximum swelling in a direction parallel with the fibers of the facial nerve. Similarly situated cruciate incisions have also been advised. With fuller understanding of the problem involved, more careful dissection with better exposure has supplanted this type of timid local removal.

2. *Janes' Incision* is started at the base of the mastoid, carried down and forward 3 inches or so behind the ramus of the mandible. Sometimes a second incision is placed anterior to the ear, joining the first below the pinna at an obtuse angle, depending on the size of the tumor. The main trunk of the facial nerve is explored anterior to the stylomastoid foramen, carrying the dissection forward, and excising a portion of the mastoid process if necessary to facilitate removal. The external carotid is tied to lessen the bleeding when dealing with large tumors.

3. *Bailey's (total parotidectomy)*: Incision is similar to that above. The first step is ligation of the external carotid artery, following which the superficial lobe is mobilized, starting the dissection at the anterior border (at the mandible) freeing around the border of the gland and then dividing the isthmus. The deep portion is then removed, retracting the facial nerve posteriorly. In removal of this lobe, it is sometimes necessary to ligate the jugular vein.

4. *Sistrunk's Incision*: The same "Y" type of incision is used, following which the inframandibular branch of the facial nerve is first isolated, then traced back to the point at which the nerve divides into its temporal and cerivcal branches. In the dissection the two extremes of the "Y" incision are deepened first, structures identified, then the incisions are connected below the pinna.

5. *Blair-Byars' Technic*: The dissection is much the same as advocated by Sistrunk, isolating the inframandibular branch of the nerve first; the skin incision is extended more in the direction of the orbit.

Damage to the facial nerve is frequently inevitable, and attempts to preserve it at the cost of incomplete excision of a tumor, especially a malignancy, are not justified. In the usual case there may be some transient paralysis due to handling, occurring usually in the lower branches and resulting in weakness of the lip and angle of the mouth. When the nerve is inadvertently severed it may be re-sutured with good prospects of regeneration, providing the branch involved is of sufficient size to lend itself to suture.

It is universally agreed that the type of anesthetic used should be general anesthesia. A local anesthesia masks the response obtained on stimulating nerve fibers, and is not consistent with adequate exposure and excision.

PROGNOSIS

I. Benign Tumors

Prognosis is excellent—with total excision, the truly benign tumors do not recur locally and do not metastasize.

II. Mixed Tumors

Accurate estimate of the chance of recurrence or of malignant transformation is not possible in considering these growths. Although mixed tumors recur in approximately 25 per cent of cases treated by excision alone, they rarely undergo malignant transformation, and rarely metastasize—the few isolated cases so reported serving to emphasize this point. Ahlbom, using combined surgical-radiation treatment reports a recurrence rate considerably less than the average of 25 per cent, and therefore of mixed tumors it may be said that with adequate treatment (combined surgical-radiation) the prognosis as to life is excellent, recurrences, even multiple ones, may occur, but the recurrent growth in most instances may be readily removed. The chance of disfiguring scar or permanent facial nerve damage is always present, but in the absence of infection most of the wounds heal kindly, and damage to the nerve is not usual in the encapsulated tumors. While no one who has ever had one of these tumors may be said to be completely out of danger, the prognosis in a slowly developing encapsulated mixed tumor, completely excised without injury to the capsule or spilling of the contents, is uniformly good.

III. Carcinoma

Prognosis of carcinoma is very poor. Local recurrences, expressed in terms of months, rather than years, is the rule, and metastases, although they do not occur as rapidly as in some other malignant growths, are to be expected. Metastases are wide-spread, involving lymph-nodes, lung, brain, and bones. The life expectancy of these people is invariably short, few surviving two years from the time of first medical treatment, regardless of type. More recently there have been reported apparent cures by total parotidectomy in early cases in which the histological picture was definite, giving hope that in the future early radical treatment may offer more hope in the management of these unfortunate victims.

IV. Sarcoma

Here again the prognosis is bad, but probably not as bad as in carcinoma. Sarcomatous parotid growths usually do not metastasize, but rather tend to recur and spread locally, rapidly infiltrating neighboring structures.

V. Digest of Various Forms of Treatment on the Prognosis

The following outline, adapted from Houck [17] is a digest of the reported experiences of various writers, with respect to the effect of various forms of treatment on the prognosis:

A. *Mixed Tumors*:

1. Untreated. (a) Life expectancy — usually grow slowly over a period of many years but rarely may undergo malignant change and may suddenly exhibit rapid growth.

(b) Symptoms and disfigurement — usually give no symptoms until large size is reached, when pressure symptoms and disfiguremnet may occur. From 15 ot 30 years may be required for the tumor to grow to a size that produces marked cosmetic disfigurement.

(c) Development of malignancy — a very small percent may undergo malignant change, exhibit acceleration of growth, and become invasive, and rarely produce metastases.

2. Treated by Surgery. (a) Life expectancy—usually a normal life span if properly excised; repeated recurrences may result in disfigurement or local invasion in cases considered to be benign microscopically.

(b) Recurrence may occur at any time during the individual's life span.

(c) Influence of trauma on rate of growth — incomplete excision may accelerate growth, but the histological picture of the recurrent mass is nearly always that of the original growth.

(d) Postoperative complications — facial nerve palsy is frequent but often transient. Other complications such as salivary fistula and ankylosis of the jaw are unusual.

3. Treated by Radiation Only. Usually unaffected, but may occasionally shrink in size. An occasional "cure" is reported.

4. Treated by Surgery Combined with Irradiation. Ahlbom reports a lower recurrence rate when treated by this method.

B. Malignant Tumors:

1. Untreated. Growth is slow but invariably fatal, death coming after invasion of the neck and head; metastases are a late occurrence.

2. Treated by Surgery. Recurrence and death are almost certain — there is a definite operative mortality, and life exepectancy averages less than two years.

3. Treated by Radiation Only. Ahlbom reports 32 per cent of 62 cases free from symptoms and signs after two years, and 23 per cent of 39 cases free from signs and symptoms after five years, with two 11-year "cures."

4. Treated by Surgery Combined with Radiation. Benedict and Meigs[4] believe radiation is of value in prolonging life, but state that a cure is not to be expected. Ahlbom gives figures to indicate that surgery plus radiation offers a better prognosis than any other form of treatment.

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Bacterial Endocarditis Involving the Right Side of the Heart

(A Case Presentation and Clinical Review)

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A 23 year old white male was admitted to the Veterans Hospital on 10 June, 1946, complaining of headache, vomiting, pain in the right arm, and stiffness of the left wrist joint. The onset of the present illness occurred at 2:00 P.M. on 5 June, 1946. The patient was driving a truck at the time and suddenly noted pain in the right arm radiating to his thumb. This pain occurred on movement of his arm. Upon his return home, he went to sleep and awakened at 8 P.M. with a very severe headache. The headache had been constantly present up until the time of admission on the tenth. For four days prior to admission, the patient vomited about twelve times daily. No coffee ground material had been noted in the vomitus. He experienced occasional chilly sensations and sweats at night. There had been no diarrhea and no sore throat He had had a slight cold, however, and there had been one episode, two days prior to admission, of stiffness of the left wrist. Patient stated that he had checked his temperature on two occasions prior to admission and found it to be 103 degrees.

Physical Examination: Physical examination on admission revealed a well-developed, well-nourished male, acutely ill, with a temperature of 103 degrees. The patient did not appear as ill as his degree of temperature would indicate. There was a questionable stiffness of the neck. He complained of some pain in the neck on slight flexion, although he was able to put his chin down on his chest. The tonsils were enlarged and the throat mildly injected. Examination of the chest was essentially negative. Examination of the heart was negative. No murmurs were audible. Blood pressure was 110/64.

On examination of the abdomen, there was slight tenderness to palpation in the epigastrium. The liver and spleen were not palpable. There were no lymph nodes palpable.

Laboratory Studies and Course: Leukocyte count on admission was 5,200 with 81 per cent neutrophiles, 16 per cent lymphocytes, 2 per cent monocytes and one per cent basophiles. There were 26 band forms noted. Sedimentation rate was 2 mm. per hour. Urine examination was negative. The initial impression was that the patient might be suffering from rheumatic fever or from benign lymphocytic meningitis.

A spinal tap was done on the 12th of June and was found to be negative. Throat cultures revealed many colonies of pneumococci. No hemolytic streptococci were noted. The patient was examined by several persons at this time, and no positive physical findings were noted. The problem was considered one of fever of undetermined origin. With this in mind, an agglutination study of the blood for typhoid, paratyphoid and brucellosis was carried out and all were found to be negative. A series of blood cultures was requested. X-ray examination of the chest and upright plate of the abdomen taken shortly after admission were found to be negative. The patient's course at this time was marked by a spiking type of fever with elevations to 102°, 103° and 104° with repeated bouts of frank chills lasting from ten minutes to a half hour.

On the 17th of June, a blood culture was reported as positive for non-hemolytic Staph. aureus, coagulase positive. The pour plates were reported as showing 20 colonies to a cubic centimeter of bood. Subsequently, three additional blood cultures were reported positive for the same organism. One culture was reported as showing 240 colonies per cubic centimeter of blood. The organism was tested for sensitivity to penicillin and was found to be sensitive to one-tenth of a unit of penicillin per cubic centimeter. It was also found to be sensitive to five-tenths of a unit of streptomycin per cubic centimeter.

On the 19th of June, the patient complained of left upper quadrant pain and pain in the left side of the chest on deep inspiration. Palpation in this vicinity of the abdomen caused definite pain. There was no particular tenderness to percussion. There was some radiation of pain to the left shoulder. At this time, the possibility of a perinephritic abscess or subdiaphragmatic abscess was considered. It was also noted that patient had a Grade I systolic murmur which was heard along the left sternal border. No petechial hemorrhages were noted. In the meantime the patient had been seen by the Neurological Service. Neurological examination was thought to be essentially negative. The patient was fluoroscoped on several occasions to determine the motion of the diaphragm and an intravenous pyelogram was done which was found to be negative. The urine examinations at this time remained essentially negative.

On the 22nd of June there were signs noted in the left chest consistent with the presence of fluid. Re-examination of the chest and comparison with previous films showed a small area of consolidation in the right costal vertebral angle with questionable evidence of free fluid in this area. There was a similar area of infiltration in the left lung. It was thought at this time that these areas might represent pneumonitis or metastatic abscesses. Fluoroscopy of the chest at this time again showed good motion of the diaphragm. The heart con-

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figuration was regarded as being normal. It was also noted that there was a pleural friction rub over the left side of the chest anteriorly just above the costal margin. The friction rub disappeared after about four days.

On the fourth day of July the patient complained of pain in the right side of chest on deep inspiration. A pleural friction rub was noted in the right anterior chest near the costal margin; and posteriorly in the right chest, there were noted signs consistent with a small amount of fluid or consolidation. The systolic murmur previously noted had in the meantime considerably increased in intensity to the point where it was classed as a Grade 3 murmur. Fluoroscopy of the heart again revealed normal configuration. No petechial hemorrhages were found at any time during the patient's illness although repeated careful examinations were made.

Treatment: After the report of the positive blood culture on the 7th of June, penicillin was started, 40,000 units every three hours. On the following day, this was increased to 40,000 units intramuscularly every two hours. This dosage of penicillin was continued for a period of ten weeks. He first became fever free on the 10th of July, 1946, and at that time felt well subjectively and continued to remain well up to the present date, September 23, 1946. Clinical improvement was noted and the patient began to eat well and gained 12 pounds in weight. Five subsequent blood cultures were found to be negative. Repeated examination of his heart, however, revealed the continued presence of a loud systolic murmur over the left border of the sternum. Re-examination of his chest by X-ray on the 26th of August showed some change in the configuration of the heart. There appeared to be straightening of the left border with slight increase in the total transverse diameter of the heart.

When last examined on September 23, 1946, the patient was entirely asymptomatic. The grade 3 systolic murmur along the left sternal border still persisted.

DISCUSSION

This patient presented a difficult diagnostic problem. The clinical picture was of marked fever associated with a staphylococcus aureus bacteremia. At first no localizing signs were apparent but the appearance of a loud systolic murmur which persisted suggested the diagnosis of bacterial endocarditis. Multiple pulmonary lesions which were thought to be infarcts were noted but no evidence of emboli to the brain, spleen or kidnesy was found and no petechia were observed. This suggested that the endocarditis involved the right side of the heart. Blumgart [1] has defined the syndrome of bacterial endocarditis involving the right side of the heart as (1) presence of a cardiac lesion involving the right side of the heart, (2) generalized evidence of infection, (3) protracted atypical pulmonary infection due to multiple septic infarcts. In this case it is difficult to accurately diagnose the cardiac lesion. The location of the loud systolic murmur along the left sternal border maximal in the third interspace suggests either a tricuspid regurgitation or an interventricular septal defect.

The response to therapy was excellent as the organism was sensitive to penicillin. The importance of determining the penicillin sensitivity of the organism cannot be over-emphasized as this is the determinng factor in the choice and dosage of the antibiotic used.

REFERENCE

1. Blumgart, H. T.: The Clinical Syndrome of Subacute Bacterial Endocarditis Involving the Right Chambers of the Heart. Med. Clin. N. A., 16:881, 1933.

Book Reviews

Proceedings of the Twenty-fourth Annual Meeting of the American Student Health Association (Bulletin No. 27) with appendix which includes an accumulative index. Minneapolis: The JOURNAL-LANCET, 1947. 120 pages, illustrated. $3.00.

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Extra copies of this publication are available for general distribution to those interested in student health. The volume includes not only the complete record of the 1946 meeting but the transactions of the Council meeting of 1945, year for which no book was published.

Division is made into three sections: Scientific section with sixteen papers and discussions on health in colleges and universities by nationally known authorities; Business section with complete minutes, reports of committees on mental hygiene, eye health, ear health, tuberculosis and five other subjects as well as the revised constitution; Appendix listing member institutions, representatives, registrants, past officers, publications, contents of earlier bulletins and index by subjects of papers and reports covered by the twenty-seven bulletins. Copies may be had by ordering from Dr. George T. Blydenburgh, Secretary, American Student Health Association, Ohio Wesleyan University, Delaware, Ohio.

Carbohydrate Metabolism, by SAMUEL SOSKIN and RACHMIEL LEVINE. 315 pages. The University of Chicago Press. Chicago, 1946. $6.00.

- - - - - - -

The stated purpose of the authors in publishing this book is to add to correlated text for students of physiology, biochemistry, and medicine. They have included the material pertaining to carbohydrate metabolism usually presented in many different courses over the entire period of medical school training. Included are very recent studies on the chemistry of tissue enzymes. The volume is copiously illustrated with diagrams, figures, and tables. R. B.

A Primer for Diabetic Patients, by RUSSELL M. WILDER, M.D., Ph.D., F.A.C.P. 8th edition. Philadelphia: W. B. Saunders Co., 1946. Pp. 192, illustrated. $1.75.

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This is the eighth edition of this popular manual for diabetic patients. Although no major changes have been made in the method of treating diabetes, minor alterations in procedure, developed since the publication of the seventh edition of this book in 1941, are included in the present volume.

The book is addressed primarily to the patient who is working out a life complicated by diabetes under the guidance of his family doctor. It is written in a concise and non-technical manner.

There is included a chapter for the physician on "Diet" which is an elucidating discussion of this phase of the treatment of diabetes.

This manual should prove useful to both patients and physicians. T. Z.

The JOURNAL LANCET

Official Journal of the

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Great Northern Railway Surgeons' Association
Minneapolis Academy of Medicine
Montana State Medical Association
North Dakota Society of Obstetrics and Gynecology
North Dakota State Medical Association
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Editorials

VETERANS ADMINISTRATION HOSPITAL

Minneapolis, Minnesota

Beginning in this issue, the publishers of JOURNAL-LANCET *are giving to the Veterans Administration Hospital in Minneapolis an opportunity to contribute some of its material to the physicians of the Upper Mid-West. The hope is that they may share with the hospital an interest in the welfare of the veteran and a scientific, as well as personal, participation in solving the medical problems which he presents.*

A little more than a year ago, the new program of medical care for the veteran was launched at the Veterans Administration Hospital in Minneapolis. Dean Harold S. Diehl of the University of Minnesota Medical School was given the responsibility by the central office of the Veterans Administration in Washington of selecting a consultant and attending staff of physicians and instituting a teaching program for residents. At this time there is a total of 54 consultants and attending physicians and 103 residents on the staff. All residents are veterans of World War II and have a background of three to seven years experience following graduation from a medical school.

This hospital is one of eight in the five states, Minnesota, Iowa, Nebraska, North and South Dakota, which comprise the Branch 8 area of the Veterans Administration. It is a general medical, surgical, and tuberculosis hospital. Its immediate area of responsibility consists of all of Minnesota, except fifteen counties near Fargo; a few counties in Northern Iowa; Western Wisconsin, and certain areas in South Dakota which are more accessible to Minneapolis by rail than to other Veterans Administration hospitals. The Minneapolis hospital, however, serves the entire branch area in the treatment of tumors, chest surgery, neurosurgery, and diagnostic and treatment problems in general. It is a center for orthopedic and other prosthetic appliances. Programs in physical medicine, corrective physical rehabilitation and educational programs are important adjunctive features in the hospital activities.

With the acquisition of the former Fort Snelling post hospital, the bed capacity has been increased to a total of 1049. The demands for hospitalization by veterans are of such proportions that facilities for their care are taxed to the limit at all times. Closer association with the University and the continued co-operation of the Mayo Foundation staff has opened a new era in the medical care of the veteran in this area. Comparable standards are being attained because of affiliation with these institutions. With the wealth of material accessible to those who can apply it to the improvement of medical care, real scientific progress in medicine can be expected. It is a challenge to every physician who has the privilege of being associated with this new program.

The Veterans Administration has embarked upon a program of research in the treatment of all forms of tuberculosis by means of streptomycin. Already some significant facts have been made known. The program has the endorsement of civilian agencies because of the high caliber of its sponsors and participants in the Veterans Administration.

This hospital has maintained a high standard of medical practice in the past but its aim is to elevate that standard even more. Those in hospital practice as in private practice, in order to raise the standard, must not only keep abreast of medical problems but must contribute to the advancement of medical science. With that goal in mind, the Minneapolis Veterans Administration Hospital is making an effort to expand the experience of the members of the staff and to transmit the acquired knowledge to other physicians.

This compilation records the work of a surgical seminar program which has been inaugurated at the hospital, along the lines of the University of Minnesota staff conference bulletin. These discussions are designed to present clinical and therapeutic problems and material of instructional value and will include contributions from all services.

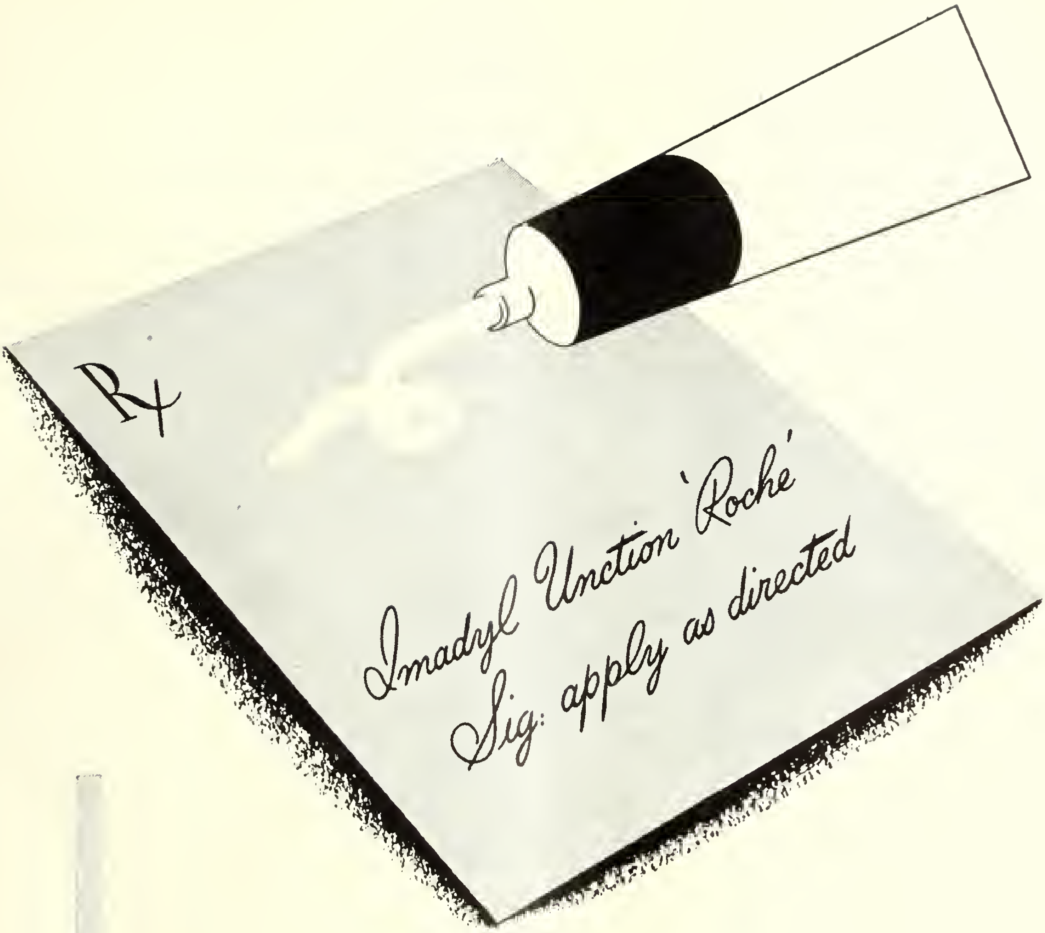
The management of the hospital feels that not only is it a privilege to serve the veterans but that it is also a privilege to work with the physicians in this area in the interest of the veterans. Harry E. Caldwell, Colonel, M.C., manager of the hospital, offers every opportunity for co-operation. He welcomes referrals from physicians and also communications in regard to service to veterans, and extends an invitation to physicians to visit the hospital and attend the seminars and conferences when in this vicinity.

SUCCESSFUL PERSONAL CONDUCT

Voltaire once said "I deem sobriety a real disease, often infectious and contagious and may be carried by physicians and nurses." How accurate this quotation is we cannot say at the moment but it is the substance of a statement from the distant past that left an impression on a still impressionable mind. It was not sobriety that attracted our attention but rather the implication that this should be accounted a real disease, that gloom should be deemed transmissible by the profession. This naturally led to a consideration of bedside manners and the impressionable effects of the physician's conduct in the presence of his patients.

Osler, in his *Aequinimitas* address warned against solemnity on the one hand and flippancy on the other. He advocated poise and "imperturbability" lest the patient suffer emotional disturbances from reading in the physician's conduct disappointment or failure on his part to understand changing symptoms in the course of an illness, the recognition of which could often be detrimental to the patient. Imperturbability means coolness and presence of mind in storm where clearness of judgment in moments of grave danger is of paramount importance. This calls for tranquility, self-possession and serenity while cheerlessness and dejection can serve no good purpose, and often do irreparable harm.

In giving advice to the young physician we might suggest a carriage neither arrogant nor servile. It is no paradox to be proud and yet modest, both are commendable



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virtues and perfectly compatible. Self respect and pride of profession are most desirable virtues; neither of these suggest insolence. Cultivate a calm and self-possessed behavior; be eager in assuaging grief, mitigating fear and relieving suffering, soft spoken when gentleness is required and outspoken when aggression is called for, clean in thought and conduct; dwell in a respectable neighborhood, and, if it must be in refined poverty, remember that in this case the adjective is more important than the noun, because, after all, poverty and riches are of the spirit.

Faithfulness to ideals, devotion to duty, sincerity of purpose and an intense interest in the work at hand will bring success. All other things being equal, a truly interested attitude will do more to make the physician popular than any other quality he may possess.

A. E. H.

News Items

The American Academy of Allergy is holding a refresher course in Omaha, Nebraska, the week of May 19, 1947. The course will be given at the University of Nebraska, College of Medicine, under the auspices of the Allergy Department.

Attendance at these meetings is open to all practitioners of medicine in this section of the country but will be limited to forty-five registrants.

Dr. John F. Preston, Jr., and Dr. Frank G. Ziobrowski have recently joined the staff of the University Health Service at the University of Michigan, Ann Arbor, Michigan.

Dr. Robert C. Cornell has been appointed Director of Student Health at the University of Maine, Orono, Maine.

Reid B. Brader, M.D., who has been associated with Doctor York in the Student Health Service at Princeton University, is looking for an opportunity in another institution. He may be addressed as follows: Reid B. Brader, M.D., 254 East Main Street, Nanticoke, Pennsylvania.

Helen M. Ross, M.D., a graduate of Tufts Medical School in 1942, and who recently finished a residency at the Pratt Diagnostic Hospital in Boston, is now employed as an Assistant Physician in the Student Health Service at the University of New Hampshire.

The Sheyenne Valley Medical Society, North Dakota, met January 31 at Valley City. Newly elected officers are: Dr. W. H. Gilsdorf, president; Dr. J. P. Merrett, vice president; Dr. C. J. Meredith, secretary-treasurer. Dr. Kent F. Wesley, Cooperstown, became a new member.

Dr. F. L. Wicks of Valley City, North Dakota, past president of the North Dakota State Medical Association and member of the State Board of Medical Examiners, was a February visitor at the JOURNAL-LANCET office en route to Iowa to visit a son at the Iowa State University.

Dr. F. R. Erenfeld, Minot, North Dakota, was elected president of the Northwest Medical Society. Dr. M. W. Garrison was named vice president; Dr. V. J. Fischer, secretary; Dr. D. J. Halliday, of Kenmare, delegate to the meeting of the state medical association next spring; and Dr. M. T. Lampert, alternate delegate. All except Dr. Halliday are Minot physicians.

Newly-elected Chiefs of Staff at Minneapolis hospitals are: Henry E. Hoffert, Asbury; Frank Hirshfield, Eitel; Ivar Sivertson, Deaconess; Jacob S. Blumenthal, St. Andrews; Charles A. Aling, St. Barnabas; James E. O'Donnell, St. Mary's (re-elected); and Paul R. Gronvall, Swedish.

Dr. E. P. Dorsey, Jr., was elected president of the Five County Medical Society, South Dakota, at the organization's annual business meeting in Wayne. The society is composed of physicians and surgeons living in Cedar, Dixon, Dakota, Wayne and Thurston counties. Dr. Max Coe of Wayne was elected vice president and Dr. F. G. Dewey of Coleridge was re-elected secretary-treasurer.

Dr. C. M. Rousseau was elected president of the Watertown District Medical Society, South Dakota, at the annual election held January 23. Other officers chosen were: Dr. Harry Bartron, Jr., vice president; Dr. J. H. Crawford, Jr., secretary-treasurer; Dr. O. S. Randall, delegate; Dr. H. T. Kenney, alternate delegate; Dr. A. P. Scheib, censor. The meeting was devoted to a discussion of the health insurance program, sponsored by the South Dakota State Medical Association.

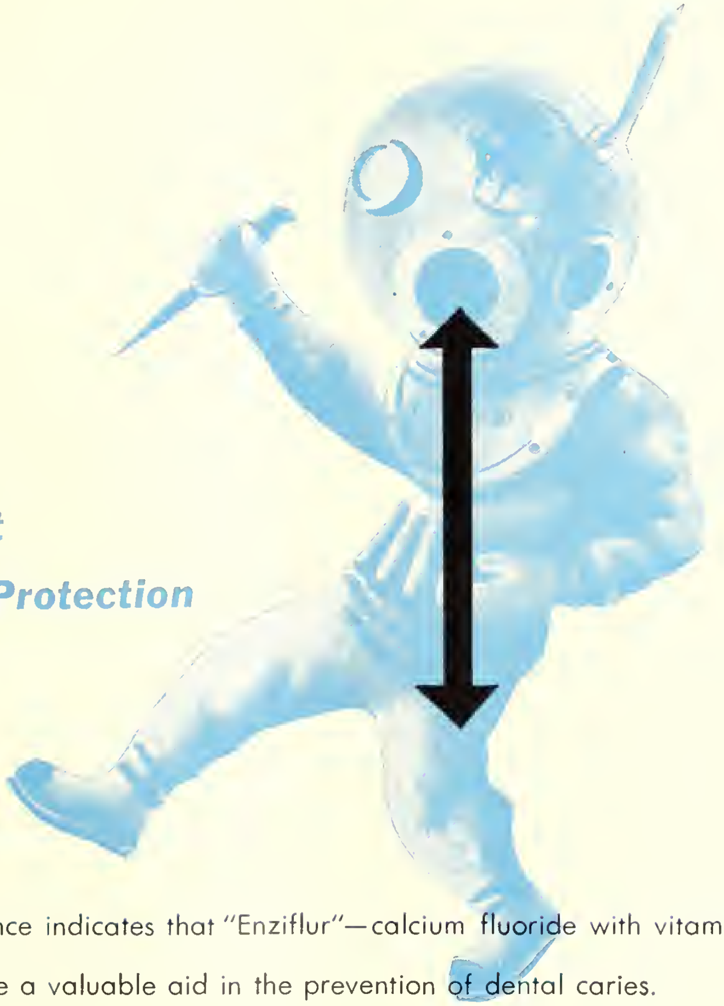
The licensing of eleven physicians by examination was announced February 3 by Dr. G. J. Van Heuvelen, acting director of the state board of health of South Dakota. They were: Clayton Behrens, Rapid City; Edith Burns, Howard Shreves, Granville Steele and Newton Wessman, Sioux Falls; Jack Dunn, Bowdle; Gesela Ebert, Yankton; Matthew A. Hetrick, Pierre; William Kilpatrick, Estelline; Wilford E. Martyn, Aberdeen, and Kenneth Petsch, Hot Springs.

The Sioux Valley Medical Association held a meeting in Sioux City, Iowa, on January 29 and 30. The following officers were elected for the coming year: Dr. J. H. Kerr, Akron, Iowa, president; Dr. Walter Benthack, Wayne, Nebraska, vice president; Dr. R. H. McBride, Sioux City, Iowa, secretary; Dr. Anton Hyden, Sioux Falls, S. D., treasurer.

Dr. W. R. Lovelace II has announced his resignation from the staffs of the Mayo Clinic and Mayo Foundation to continue the practice of his uncle at Albuquerque, New Mexico.

Minnesota American Legion units will launch a campaign in April to raise $500,000 for a rheumatic fever and heart research professorship at the University of Minnesota. The professorship would operate in connection with the heart hospital to be erected at the university. Chairman of the campaign will be Dr. L. F. Richdorf, Minneapolis.

Dr. Myron O. Henry, Minneapolis, was named president-elect of the American Academy of Orthopedic Surgeons January 30.



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The Third American Congress on Obstetrics and Gynecology will be held September 8-12, 1947, in St. Louis. The office of the Congress is at 24 West Ohio Street, Chicago 10, Illinois.

Dr. Ralph H. Creighton was elected president of the Hennepin County Medical Society to take office in October. Other officers named were Dr. Robert L. Wilder and Dr. Wm. P. Sadler, vice presidents; Dr. Charles A. Aling, secretary-treasurer, and new members of the board include Drs. Willard D. White and John H. Moe, board of directors, Drs. Edwin G. Benjamin and Otto W. Yoerg, board of censors; Drs. S. Marx White and Vernon L. Hart, board of ethics.

Deaths

Dr. Harris M. Erenfeld, 76, Minot, North Dakota, president of the Trinity hospital staff, died January 16.

Dr. John R. E. Sievers, 76, physician and surgeon for the past 50 years in Butte, Montana, died January 13.

Dr. George R. Christie, 89, who practiced at Long Prairie, Minnesota, for 60 years, died January 20 in Minneapolis.

Dr. Carl M. Johnson, 64, surgeon for 30 years in Dawson, Minnesota, and head of the Dawson hospital, died February 1.

Dr. Lee W. Pollock, Rochester, Minnesota, Mayo Clinic physician for many years and assistant professor of medicine in the Mayo Foundation, died the latter part of January.

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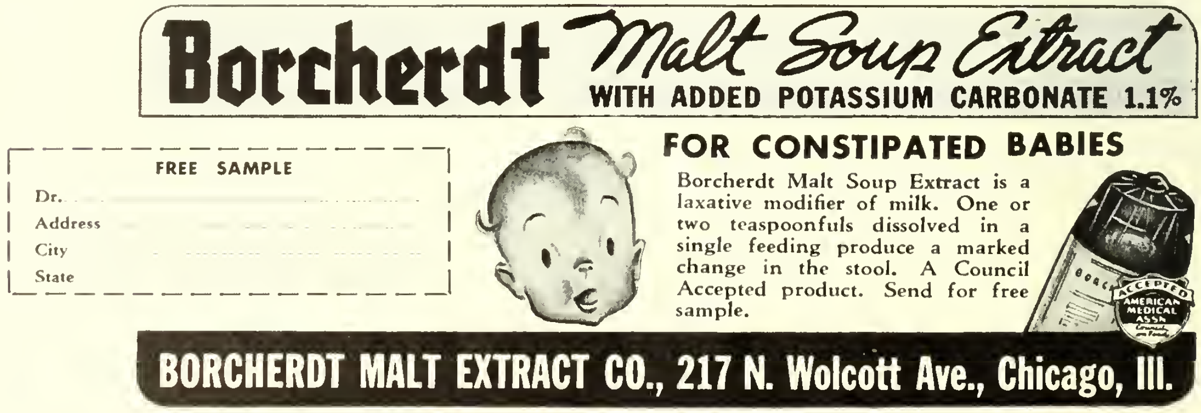

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Minneapolis, Minnesota
April, 1947

Vol. LXVII, No. 4
New Series

Foreword

Early Diagnosis

Detection of infectious disease in its early stage is an undisputed tenet of good medical practice. On it often hangs the hope of cure. Most infections reveal their characteristics with acute, recognizable symptoms. Tuberculosis is an outstanding exception. Hence the need of applying extraordinary diagnostic methods to discover a disease in which symptoms may lie dormant certainly for weeks or months.

The Early Diagnosis Campaign was established some twenty years ago to stress this fact through both popular and professional education. It is still playing its important role in the control of tuberculosis.

From the beginning the Journal-Lancet has supplied a spearhead in the campaign. Witness the significance of some of the contents of the current issue: the physician's educational responsibility, mass X-ray in laboring groups, protection of the child, meaning of symptoms, evaluation of antibiotics, intensive study of student groups. It is through such important educational, preventive and treatment practices that tuberculosis is gradually yielding to organized lay, public health and professional pressure.

All tuberculosis workers join in praise of Journal-Lancet's pioneer work in promoting early discovery of lesions. Equal appreciation is due its continuous advocacy of new and well tested measures for the best protection of both the patient and his community.

Kendall Emerson, M.D.,
Managing Director,
National Tuberculosis Association

The Importance of Accurate Diagnosis in Tuberculosis

W. J. Bryan, M.D.*
Rockford, Illinois

The importance of a correct diagnosis of pulmonary lesions cannot be overestimated. It is not always easy to determine the etiology of such lesions; neither is it easy to determine whether the lesion is stable, potentially unstable, or progressively active. However, if the physician utilizes all of the diagnostic aids now at his command, a satisfactory diagnosis can usually be made.

The history which the patient gives will often provide a clue, but many times, unfortunately, especially in tuberculosis and other diseases of the chest, it may be many days, months, or even years before symptoms become sufficient to alarm the patient and send him to the doctor. It is a well-recognized fact that most cases of tuberculosis at some time or other pass through the hands of the family physician, and unless he is aware of the possibility of such a diagnosis, it will often be missed completely.

It is impossible in this short paper to discuss all of the procedures which may be utilized in the diagnosis of pulmonary disease. However, I would like to re-emphasize the importance of the three diagnostic procedures which can be carried out in the physician's office and in the clinic, which, when properly used, will lessen to a great degree the chances for error in the diagnosis of pulmonary tuberculosis; namely, the tuberculin test, the chest X-ray, and the analysis of sputum or gastric contents for tubercle bacilli. The application of these tests will not be discussed in detail at this time. The tuberculin used, however, should be fresh and given in sufficient dosage and properly interpreted. The chest X-ray should be properly exposed, properly developed, and should give a clear delineation of the normal lung structure. Sputum, when present, should be examined sufficiently often, both by direct smear and culture. If no sputum is present, gastric contents should be similarly examined. As important as the X-ray is in the diagnosis and treatment of pulmonary tuberculosis, too many X-ray diagnoses are made without considering the tuberculin test or the sputum examination. On the other hand, the tuberculin test alone will not be sufficient, even though positive, to make a diagnosis of active tuberculosis; but, if it is negative, it will in most instances rule out the presence of tuberculosis in the body, provided the tuberculin is of sufficient strength and adequate dosage has been properly administered and interpreted. I would no more be without the tuberculin test than I would without the X-ray or sputum examination. Regardless of whether or not the X-ray shows lesions on the film, if the sputum contains tubercle bacilli, the diagnosis is without doubt. In very rare occasions, organisms which stain acid-fast may not be tubercle bacilli. This is particularly true of the gastric contents, and the finding of acid-fast bacilli in the gastric contents should be proved by culture or guinea pig inoculation. If the general practitioner will make tuberculin testing a part of his routine examination, to be followed by X-ray and sputum analysis when the tuberculin test is positive, he will not only help to find early cases of tuberculosis but will relieve himself of many unnecessary criticisms. The knowledge that these three laboratory procedures are usually sufficient to make an accurate diagnosis of pulmonary tuberculosis is well known to the tuberculosis specialist, but it is unfortunate that many physicians, surgeons, and specialists do not know their significance.

The following short case histories will serve to emphasize their importance:

While preparing this paper, the following story was related to me by telephone: "Doctor, I have a 22-year-old woman on whom I operated about ten days ago. I found an elongated ulcer-like lesion in the jejunum. I thought it was a cancer and did an end-to-end anastomosis. The pathologist has advised me that this was a tuberculous lesion, and my resident has just now told me that the patient's sputum contains acid-fast organisms. The X-ray shows a normal chest. No tuberculin test has been done. I would like to transfer her to your service."

Another case to illustrate the importance of diagnosis in lung disease may be found in the following case history: A 17-year-old white female, a senior high school student, was required to have a tuberculin test and X-ray inspection of her chest for college entrance. Tuberculin tests had been given in the high school, but she had refused this because she had been too busy making good grades. The tuberculin test was positive, and the X-ray showed a two centimeter cavity in the left lung surrounded by a soft infiltrative type of lesion and a two centimeter cavity in the right lung. The patient had no symptoms suggestive of disease. She had been examined about two months prior to the examination required by the college to which she had applied and had been given a clean bill of health by a very competent physician. However, he had not administered a tuberculin test, nor had he recommended an X-ray inspection of the chest. The patient was admitted to the sanatorium for treatment, and, although no tubercle bacilli were ever found in the sputum or gastric contents, subsequent course of the patient's disease indicated that she had active moderately advanced tuberculosis. Although the patient was hospitalized for the better part of three years and it was necessary for her to have a phrenic nerve operation, pneumoperitoneum, and finally an upper-stage thoracoplasty, she made a nice recovery and has been leading an active life for the past three years. This physician was made tuberculin conscious by this case and now uses the tuberculin test and X-ray as a part of his routine physical examinations. Needless to say, he has discovered many early cases of tuberculosis which he might not have otherwise discovered until the disease was far advanced.

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*President, Illinois Tuberculosis Association; Superintendent and Medical Director, Rockford Municipal Tuberculosis Sanitarium, Rockford, Illinois.

The value of a negative tuberculin test can be emphasized in the following case: A 10-year-old boy was sent to the sanatorium in July, 1944, because of a poor appetite and a seven-pound loss of weight. The tuberculin test given in strengths of 0.1 mgm. and 1.0 mgm. were negative, but the X-ray taken showed both lung fields to be studied with small round calcifications. There was no evidence of soft infiltration and no active disease. A tentative diagnosis of healed miliary tuberculosis was considered. The patient returned for subsequent X-rays December 28, 1945, and December 26, 1946, and at the latter date the examiner became convinced that the patient did not have tuberculosis. Tuberculin tests were again repeated, and both strengths were negative. Histoplasmin was given intracutaneously and found positive. The diagnosis of healed miliary tuberculosis was removed, and the patient, who is in good health at the present time, may feel sure that his chances for insurance will not be adversely affected. Further investigation of this patient's family revealed that his three sisters, who reacted negative to tuberculin, were positive to histoplasmin. X-rays revealed calcifications in all cases.

Another case of interest in diagnosis is that of a 38-year-old white male who was treated at the Elgin State Hospital for cerebral syphilis. This patient was refused heat therapy on the grounds that his X-ray showed numerous calcifications from "tuberculosis." The patient was referred to this institution for diagnosis in 1943. It was noted that there were myriads of calcifications throughout both lungs, and again the possibility of miliary tuberculosis was considered. For some reason, a tuberculin test was not done. On January 20, 1947, the patient was found negative to 0.1 mgm. O.T. and on January 25, 1947, had a slight reaction to 1.0 mgm. O.T. Histoplasmin test was found to be positive, and no doubt a diagnosis of histoplasmosis can account for most of the calicifications found in the chest. The diagnosis of healed miliary tuberculosis was removed, and the patient may now continue with the treatment which was formerly denied him.

Following is a brief history of a 50-year-old white female who entered this hospital in July, 1946, with a history of having been treated for pulmonary tuberculosis in a sanatorium from 1924 to 1929. She dated her present ill health from December, 1945, at which time she had influenza and was out of work for a week. She continued to have frequent colds throughout the remainder of the winter, and in March began to lose weight rapidly and became markedly fatigued. She did not cough or expectorate but felt a heavy pressure within her chest. She was finally hospitalized in May, 1946. An X-ray at that time revealed fluid in her left chest, which was withdrawn on several occasions. This film also showed numerous small miliary-like densities throughout the right lung field and a small area of density in the upper pole of the left hilus. Fluid was removed several times in May, and in July the patient was admitted to the Rockford Municipal Tuberculosis Sanitarium. An X-ray at that time was similar to the previous one taken in May, in that fluid was still present in the left base and the opacity in the left hilus was also still present. The nodular densities seen throughout the right lung had become more numerous. The last film taken before the patient's death also showed these nodular densities in the left upper lobe. The patient's tuberculin test was positive, but at no time were tubercle bacilli found in her sputum or in the pleural fluid. The last fluid withdrawn was bloody. Microsection of the sediment from the pleural fluid revealed large characteristic carcinomatous cells. The possibility of miliary tuberculosis was considered for some time, but the general course of the patient's disease, the absence of fever, accompanied by the persistent formation of fluid and the finding of carcinomatous cells in the fluid was sufficient to make a diagnosis of carcinoma with probable lymphatic spread into the other lung field. The persistent absence of tubercle bacilli in the body secretions, even in the presence of a positive tuberculin test and abnormal X-ray densities, should lead one to suspect other etiological factors.

I might continue to describe similar case histories, but these should be sufficient to emphasize the value of utilizing these well-known methods of diagnosis to their utmost. There are those who believe that the X-ray alone is sufficient to diagnose tuberculosis. There are a few others who believe that the tuberculin test, when positive, indicates active disease; and there are still others who are satisfied when they have obtained a negative sputum test, but it has been our experience that each of these procedures has definite indications and limitations and should be employed in the routine examination. The tuberculin test, when positive, indicates the presence of tubercle bacilli in the body. The chest X-ray will show us normal or abnormal shadows in the lung and does not necessarily rule out the presence of tuberculosis in those hidden areas of the lung not seen by the X-ray or elsewhere in the body. The sputum examination, when tubercle bacilli are found, is the most conclusive evidence that the patient has active disease.

NEGRO DEATH RATE FROM TUBERCULOSIS

Aside from heart disease, the leading killer of both white and colored people, tuberculosis is one of the worst enemies of the Negro. Despite a mortality reduction from 186.6 in 1929-31 to 98.0 per 100,000 in 1945 (the latest figures available), the Negro death rate from this disease is still three times as great as the white rate. Based on estimated population figures for 1945, approximately 12,000 Negro men and women will die of tuberculosis this year. —*Public Health Reports.*

Responsibility of the Physician in the Education of the Tuberculous

A. A. Pleyte, M.D.
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QUITE naturally the physician's primary interest in medicine is diagnosis and treatment. Intelligent treatment and handling of the patient and his family depend on the complete diagnosis of the patient's illness. In no disease is this more true than in tuberculosis. While the physician must try to arrive at a diagnosis as soon as possible, tuberculosis is not always found in its earlier stages. Frequently patients will report to the doctor for the first time when there is considerable evidence of disease as shown by chest X-ray inspection. Often they are not sick and have not realized the seriousness of their condition.

Unfortunately, because tuberculosis is a communicable disease, not only the infection may have been spread to others, but susceptible contacts may be developing pulmonary lesions. Such contacts are found more often in the home of the untrained open case, but do occur in the schoolroom, factory, hospital, asylum, and elsewhere. Many of us have seen families where multiple deaths have taken place, and other families where multiple cases have developed. In Wisconsin, since 1929, we have a record as revealed by death certificates of approximately 1,000 families where there have been two or more deaths from tuberculosis.

AN EPIDEMIC FAMILY DISEASE

The fact that tuberculosis is still an epidemic family disease even in a state like Wisconsin (and probably in other states and countries as well) with a death rate of 20.7 per 100,000 population in 1945, suggests to us immediately the importance of the family physician not only in diagnosis and treatment of the tuberculous individual, but in the search for the disease in other members of the family and in the education of the whole family in order to stop the spread of infection. Education of the patient and other members of the family where a case of tubercuolsis has been ferreted out is of as great or greater importance, we believe, as the original diagnosis. It is an additional opportunity and obligation for the family physician to properly inform the patient and the family about tuberculosis.

We believe all must agree with Sir William Osler's advice on tuberculosis to the general practitioner, "The leadership of the battle against this scourge is in your hands. Much has been done, much remains to be done. By early diagnosis and prompt, systematic treatment of individual cases, by striving in every possible way to improve the social condition of the poor, by joining actively in the work of the local and national anti-tubercuolsis societies, you can help in the most important and the most hopeful campaign ever undertaken by the profession."

The family physician can best educate the family where there is a case of tuberculosis because it is he who sees the patient first. It is he who knows best the family history. It is he who realizes the family adjustments which may be needed. It is he who can direct the proper course of procedure in epidemiology. Intimate contact of other members of the family with the patient must be avoided. Both the patient and the family need to be informed in simple language about the infectious character of tubercuolsis; how it is transmitted; the necessity of isolating the open case; the proper disposal of sputum; how to cover the cough and sneeze; and how to provide for general cleanliness. These are reasons enough, we believe, to establish the responsibility of the attending physician in the education of the tuberculous.

Isolation in the sanatorium is best for the patient, and does not necessitate virtually turning the home into a modified sanatorium. But many tuberculous individuals are not easily persuaded to enter a hospital or sanatorium for treatment when they feel perfectly healthy. However, this is all the more reason for the family physician's supervision of patients and families where the disease is known to exist.

PROPER MODE OF LIFE

The tuberculous patient needs to be taught a proper mode of life. He needs supervision of his activities. These include bed rest at first, exercise in a graded form later on, and careful guidance in his mental attitudes and activities. The family also must usually make adjustments in their mode of life. Thus we gradually come to realize that such words as father, mother, brother, sister, grandparents and children take on real social significance. No one appreciates more than the family physician the social situation brought about by the father (breadwinner) or the mother (breadmaker) who develops this disease.

In order to help the physician in the execution of the many details of a properly guided educational program for the family facing the many social implications of the tuberculosis problem, the trained medical social worker and the well-trained public health nurse can be of inestimable service. Ex-sanatorium patients, too, more and more see opportunity for service in the campaign to eradicate the disease in human beings. When organized as "Come-Backers" and under supervision of the physician, they can aid members of their families, other patients, and other people in the community to obtain a better understanding of tuberculosis as it affects our complex society.

DELAY IN SANATORIUM CARE

When the patient and his family receive inadequate information about this disease, we sometimes see a delay in accepting sanatorium care. Usually the sooner a patient is persuaded to the desirability of sanatorium treatment, the better it is for the patient and the family. The patient with minimal tuberculosis, particularly the young person, needs strict supervision, and sometimes over a rather long period of time. It is no small task for the physician to convince the patient to accept sanatorium isolation and direction of activities during and after the cure-taking sojourn. Part of the task is usually deferred until the physician, the patient, and the patient's family can better appreciate the course the disease may take. But by cooperative effort under competent medical guidance, tuberculous patients may not only recover their health, but may become recognized as prominent citizens in their communities. They have gone through hardships and trials which have made them stronger and more useful than they were before illness set in.

Educational Lags in the Early Discovery of Tuberculosis

Insufficient instruction on the early discovery of minimal pulmonary lesions has resulted many times in one or more members of the family developing tuberculosis under our very eyes. It is not always enough to advise the family to have periodic X-ray examinations of tuberculin reactors. It has been demonstrated that two out of every three minimal cases of tuberculosis found in case discovery programs are inactive. However, all should be referred to the family physician for further study and observation. It is his duty and responsibility to determine whether the lesions are active or inactive.

While the method of approach and the method of procedure in handling tuberculosis will vary in different patients, families and communities, at least general desiderata are applicable. These have been stated often, but bear repeating. They include (1) Continued education of physicians, social workers, nurses, and laymen in the general tuberculosis problem, and more particularly for each group in the phase of tuberculosis activity in which such group is primarily interested. (2) Discovery of and enlightenment on the disease as soon as possible among (a) contacts, (b) Negroes, (c) Indians, (d) asylum patients, (e) susceptible and underprivileged groups, (f) general hospital admissions. (g) Physicians, nurses, undergraduates in medical and nursing schools, and hospital personnel. (h) industrial groups, (i) high school and junior high school students, (j) when possible, all apparently healthy human beings should be searched for evidence of tuberculosis. (3) Isolation and training of "open" cases. (4) Adequate therapy and supervision for all known cases. (5) Rehabilitation. (6) Continued observation of ex-patients and their families.

This is an order hardly within the province of any one individual, or any limited group of individuals. Rightly interpreted, we believe it is a job for everybody. When the order is divided into educational, public health, medical, social, nursing, and rehabilitation phases for given sections, districts or counties, the problem is not as formidable.

The doctor, through the social worker or nurse, needs to remind the contacts of the necessity of periodic X-ray check-up and even help arrange for a date for the examination. This may seem like a trivial point, but we still see early and advanced cases of tuberculosis develop during a period when these contacts were not brought in for study. The apparently healthy person with tuberculosis, or the person afraid that tuberculosis may be found, needs to be indoctrinated with the importance of early discovery of the disease through periodic chest X-ray examination, and with the possible sad result from not facing the situation if and when suspicious evidence of the disease is found to be present.

No one will deny that with a communicable and often an epidemic family disease like tuberculosis, the attending physician is in a most strategic position to properly evaluate the complicated social situation which is so often found to exist. It is his duty to explain clearly to the patient or the near relatives, or to both, the meaning of the diagnosis and its medical and social import. He must present the best treatment available to both the patient and the family so that they are convinced. When sanatorium care is accepted, the doctor can usually get assistance from a social worker or a public health nurse in making necessary arrangements for such care. If the patient is kept at home, most careful planning of a twenty-four-hour schedule for both him and his family is required. In either case, the physician should welcome the suggestions and help of public health authorities. His educational efforts should be coordinated with those of the nurse and social worker so that contacts will receive the prescribed examinations and program; so that adequate food, care and supervision are arranged for the family; and so that the proper cooperation of the family is secured in the patient's treatment.

Insufficient Education in the Sanatorium

Meager efforts in informing sanatorium patients lead to misunderstandings on the part of both employees and patients. There gradually develops a lack of appreciation of medical and nursing care, the home sacrifices which were made necessary by the patient going to the sanatorium, and the failure of the patient to realize the importance of his disease to his family and to the community. We believe if patients are well informed there will be fewer leaving against medical advice. The patient who leaves the sanatorium against medical advice is likely to be a "seed spreader," a nonconformist from a broad social viewpoint, and probably not a good citizen. Can the sanatorium physician, the social worker, the nurse, the family or the "Come-Backer," individually or through their combined efforts influence the patient to take the proper attitude toward himself, his family and the community? Perhaps the patient cannot always be led to accept the best therapy and advice, but we believe he can far more often than past records of A.M.A. discharges would indicate.

Responsibility of the Sanatorium Physician, Nurses and Social Workers in the Education of the Tuberculous

The sanatorium should be the first resort for the tuberculous, not the last. This dictum is not new. The sanatorium and its physicians are usually best versed in the care of tuberculosis. Their desire is to make the sanatorium the center of tuberculosis activities in their community. This, of course, presupposes the responsibility of the sanatorium physician to his patients, to each patient's family, and to the community served by the institution. He shares with the family physician the burden of teaching both patient and family the infectious nature of the disease, what constitutes adequate therapy, protection of healthy family members, the true meaning of rehabilitation and the time needed before the patient can return to work.

It is under the supervision of the sanatorium physician that new patients are oriented to life in the institution. He can do more than any other person to place the patient in harmony with the type of surroundings and the type of life furnished at the sanatorium. He must take time to furnish proper instruction to the patient, including an explanation of rules for proper conduct. He can best give the patient the necessary sympathy, kindness and help in understanding sanatorium life and its advantages. It is his duty to make daily calls on patients, to discuss the intimate details of their illness, to handle the case, and to prescribe and advise management and treatment.

The sanatorium physician is required to give special attention to the unstable or emotionally maladjusted patient. He must strive for high morale among employees and an *esprit de corps* among the patients of which he can be proud.

He can, through staff meetings for physicians, nurses and social workers, iron out at an early time any misunderstandings which may arise, discuss institutional or home problems concerning the patient or employees and strive for a coordinated program of cure-taking.

"In-training" educational efforts in behalf of nurses, employees and patients, today more than ever before, must be made an integral part of the educational program in the sanatorium. This can be accomplished through lectures, questions and answers, radio loudspeaker, sanatorium periodicals, literature, charts, and movies.

Insofar as rest for body, mind, and soul is a requisite in sanatorium life, quietness in the institution becomes a necessity. Particularly is this true for the rest periods in the daily routine.

Visitors, as we all know, can be desirable, but can also be a nuisance. Properly handled, visitors can be turned into an asset for the institution. We agree that visitors should be taught how to visit a patient. To bring unnecessary burdens from home to the patient must be avoided.

The sanatorium should have a Good Fellowship Club which if carefully guided can serve a useful purpose in behalf of the patients and, at times, in behalf of the sanatorium.

Patients must be comfortable. Prolonged rest in bed requires stamina. It is not easy to rest in bed week after week. Attention must be given to a comfortable bed properly made, including warmth in coverings both over and under the patient in the winter months. The patient needs to be taught how to rest. Comfortable rest in bed is almost an art.

Surroundings that are pleasant, including the view out of doors, the clean room which is not too plain, the cheerful roommate and the kindly considered word from attendants all help to create a pleasant atmosphere for the patient.

Modern therapy in tuberculosis combines the advantages of hospital care and sanatorium guidance. Today, patients soon ask about surgical aid. Again the sanatorium physician, having made a complete medical evaluation of the patient, is best able to counsel him. Occupational therapy programs, medical social work by a trained worker and coordinated with the medical program, and medical consultation are all necessary parts of the modern sanatorium.

SUMMARY

We feel it is apparent from the foregoing discussion that the family doctor or the attending physician, the health officer, the phthisiologist, and the consultant all have responsibility, in part for the proper handling of tuberculosis. Trained medical social workers, public health nurses, and interested, educated laymen are of inestimable help to the physician in handling a social and medical problem like tuberculosis, but the doctor always must play his part willingly.

While the organized campaign against tuberculosis has been successful in the United States as judged by the lowering of the death rate by three-fourths, the eradication of the disease can be accelerated through continued educational programs in prevention, modern therapy, and rehabilitation, through educational efforts in uncovering both old and new cases, and through properly guiding the activities of patients for the remainder of their lives.

The leadership in this winning fight must ever be the responsibility of the physician. No one can substitute for him in the diagnosis, treatment, and education of the tuberculous. All must assist him.

E. STARR JUDD LECTURE

The fourteenth E. Starr Judd lecture will be given by Dr. I. S. Ravdin, John Rhea Barton Professor of Surgery at the University of Pennsylvania, Tuesday evening, April 15, 1947, at 8:15 in the Auditorium of the Museum of Natural History. Doctor Ravdin's subject is "Changing Concepts in Surgical Care."

The late E. Starr Judd, an alumnus of the Medical School of the University of Minnesota, established this annual lectureship in Surgery a few years before his death.

The Antibacterial Approach to the Treatment of Tuberculosis*

(*The Clarence Jackson Lecture for 1947*)

H. Corwin Hinshaw, M.D., Ph.D.
Rochester, Minnesota

Present-day medical research is not always greatly different from that practiced by physicians and laymen of ancient times. Primitive peoples in many parts of the earth independently have developed the conception that somewhere in nature there is produced a curative drug for every disease. Their physicians, medicine men or priests, have sought these remedies assiduously for generations. The principal sources of material with which to combat disease have been living products of nature, especially various extracts of wild and cultivated plants. By tireless methods of trial and error, these primitive physicians have discovered many remedies which are invaluable even today. Long ago they found ipecac, from which emetine is made and which is still a specific for amebic dysentery. They found opium in the poppy plant, from which our indispensable morphine derivatives have been developed and which are used to ease the pain of millions. They found digitalis in the leaves of the foxglove plant, and digitalis is truly a "miracle drug" for many types of heart disease today. Generations ago they found quinine in the bark of cinchona trees and learned of its specific action on malaria.

Had these ancients been able to extend their search to the lower plants, to the fungi, to micro-organisms of the soil, they might have found tyrothricin, penicillin, streptomycin and bacitracin, and surely by now we would have had even superior drugs for the treatment of bacterial infection.

Now, after many generations, we find ourselves returning to the methods of these ancients, making extracts of plants, seeking drugs of unknown composition and drugs of obscure action, and the method of search which we employ is still that of trial and error, with a few improvements in technic.

These few improvements, however, have greatly facilitated the search, and especially our ability to grow disease-producing agents outside the animal body. Most of our antibacterial drugs in use today were evolved by study of their effect upon cultures of disease-producing bacteria, a procedure much simpler than that of primitive physicians who could only study the disease in the human body.

Very early in the history of bacteriology it was discovered that pure cultures of bacteria often became contaminated with bacteria from the air or soil, or with fungi. When this occurred the more delicate, disease-producing bacteria were sometimes destroyed. Sir Howard Florey's Lister Lecture, which was published in the *British Medical Journal* on November 10, 1945, describes some extremely early efforts to modify the course of tuberculosis in man by utilization of the antagonistic effects of bacteria living free in nature.

It is logical that the disease, tuberculosis, should have been chosen for such study then and now because throughout history, up to and including the present time, tuberculosis has been the most destructive infectious disease of mankind. Although tuberculosis has declined in importance through recent generations and undoubtedly will continue to do so, that statement still holds. Even in this enlightened day, even in this enlightened land, tuberculosis remains the most important killer of young people, and in all age groups it stands ahead of other infectious diseases as a cause of suffering and death. The degenerative diseases, such as cancer, diabetes and arteriosclerosis, are not infectious diseases, and thus far we have no important clue as to how they can be prevented.

During the war years tuberculosis in this country was at an all-time low incidence. Despite this fact, the number of persons dying from the disease in the United States was approximately the same as the number of persons dying as a result of battle casualties in our armed forces.

In some other nations of the earth, so much less fortunate than we are, tuberculosis is approaching the proportions of an epidemic disease, and it is probably true that today one could not walk for a single block in any city in continental Europe without passing on the street not one but several persons with open, active, contagious tuberculosis. In France one person in every twenty of the entire population is said to have tuberculosis in active form. In the little country of Yugoslavia the number of persons dying of the disease is said to be approximately the same as the number of persons dying of tuberculosis in the whole United States. I mention these facts merely to point out how desperately humanity is in need of any small contribution which can be made toward the prevention and control of this plague.

The causative organism of tuberculosis, Mycobacterium tuberculosis, has long been regarded as a bacterium set apart from all other pathogenic micro-organisms and the disease it produces is strange, clinically, pathologically and immunologically. The tubercle bacillus is a most successful pathogen, for the ideal pathogen is one which can live in relative peace within the body of its host and not destroy too rapidly that body which yields it shelter and nourishment.

For generations, every direct effort to curb the tubercle bacillus in man by drugs or even in the experimental laboratory has been fruitless. In a spirit of frustration many scientists have come to regard the difficulties of the task as insuperable. They have frequently fallen back on the explanation that the peculiar staining properties of this organism indicate the existence of some impervious capsule or coating which prevents the penetration of water-soluble drugs. It is very easy to refute this conception on several grounds but I shall mention only two. First, it is readily demonstrated that this alleged lipoid barrier does not prevent exchange of water-soluble metabolic products between the interior and exterior of the bacterial cell; second, the tubercle bacillus is extremely sensitive to many water-soluble antibacterial substances when it is growing in culture.

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*Presented under the auspices of the Phi Beta Pi Medical Fraternity, University of Minnesota, January 14, 1947.

†Division of Medicine, Mayo Clinic.

Indeed, it has been known since the time of Robert Koch that compounds of gold and mercury and many other substances would inhibit cultures of tubercle bacilli, even in fantastically dilute solutions. Although bacilli growing in cultures were inhibited readily by many substances of both natural and synthetic origin, bacilli growing in the animal body were refractory to all types of drugs. The usual test animal was, and is, the guinea pig, and it was frequently concluded that this animal was so extremely susceptible to tuberculosis that no drug should be expected to yield results when placed under such handicaps. However, this argument was not convincing to many because it is quite possible to build up in the guinea pig an appreciable acquired immunity to tuberculosis by active immunization with attenuated bacilli.

In 1932 Dr. H. Gideon Wells published in the *Yale Journal of Biology and Medicine* a review of chemotherapy in tuberculosis up to that date. He explored the possibilities of such substances as copper compounds, chaulmoogra oil, the arsenicals, guaiacol, the fat-soluble antiseptic agents and many others, and concluded with the following statement: "A specific chemotherapy of tuberculosis has not been found and it may be a long time in coming because of the inherent difficulties of the problem." He closed his admirable review with the following statement: "Probably some new success with some other bacterial infection will be needed to stimulate a new attack upon the more difficult problem offered by tuberculosis."

When the sulfonamide drugs first appeared, efforts were made to apply these to the problem of tuberculosis. These were unsuccessful, although they did yield some slight encouragement by demonstrating that cultures of tubercle bacilli could be inhibited by sulfanilamide compounds, and even that the disease in guinea pigs could be somewhat retarded, although under no circumstanecs was it possible to bring about an arrest of experimental tuberculosis in the guinea pig by any compound derived from sulfanilamide.

Many other substances were studied, with similar disappointments, and the problem might have been abandoned had it not been revealed that compounds of diaminodiphenylsulfone were capable not only of retarding, but actually of arresting the progress and finally of healing, lesions of tuberculosis in the highly susceptible guinea pig. My colleague, Dr. William H. Feldman, and I have had the fortunate opportunity of working with these substances for the past eight or nine years, and with a group of laboratory and clinical collaborators have been able to follow several of these substances from culture tube to guinea pig, and finally to practical application in human beings.

The first compound found in Dr. Feldman's laboratory to be capable of arresting and even capable of apparently healing well-advanced experimental tuberculosis of guinea pigs was the diaminodiphenylsulfone derivative called "promin." Evidence has been recorded which fully demonstrates the decisive and consistent ability of promin to combat successfully tuberculous infection in the guinea pig, a feat which had not been accomplished previously.

Some scores of other compounds of diaminodiphenylsulfone have been studied and, unfortunately, none of these is clearly superior to promin. It is indeed probable that most or all of the effective sulfone substances are effective to the degree that they are metabolized to yield diaminodiphenylsulfone, and it is probable that this may be the effective portion of the chemical radical. An exception to this may be the drug, promizole, and for some time hope was nourished that this substance would yield practical results in clinical tuberculosis.

My colleagues* and I have had the opportunity of observing the effects of treatment with promin on more than 100 persons with clinical tuberculosis, and nearly as many have been treated with promizole. The conclusions finally reached were that promin is a substance too difficult to use and too toxic in its potentialities to justify recommending it for treatment of the usual types of tuberculous infection. Furthermore, it was found to be too weak in its action to control those universally fatal types of disease such as tuberculous meningitis and miliary tuberculosis, in which it would be justifiable to employ a substance of high toxicity.*

In the case of promizole,* reasonably convincing evidence has been accumulated to indicate that the drug is metabolized somewhat differently in the human body than in the guinea pig body, and that it is conjugated to an inactive form, a form less toxic but unfortunately much less effective against the bacillus of tuberculosis.

The results of the treatment of experimental tuberculosis with promin were sufficiently encouraging to suggest that this drug and its relatives be employed against leprosy. The organism which causes leprosy is rather closely related to the organism which causes tuberculosis, and there are some similarities, bacteriologically, clinically and pathologically, between leprosy and tuberculosis. Dr. Faget at the National Leprosarium at Carville, Louisiana, recently has reported that promin and related substances have proved to be practical and effective drugs in the treatment of leprosy. There is reason to believe that the Mycobacterium which causes leprosy is even more susceptible to the action of diaminodiphenylsulfone compounds than is the Mycobacterium which causes tuberculosis.

When penicillin was revealed to be a drug of such unbelievably low toxicity and of such gratifying antibacterial potency, its effect on the bacillus of tuberculosis was immediately studied, but unfortunately was found to be entirely disappointing.

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*Dr. Karl Pfuetze of the Mineral Springs Sanatorium, Cannon Falls, Minnesota, has been an invaluable collaborator for several years in these and other studies.

*Dr. J. A. Myers of the University of Minnesota and Dr. H. A. Burns of the Division of Public Institutions of the state of Minnesota have collaborated in clinical studies on promizole.

However, I mentioned earlier that Sir Howard Florey's Lister Lecture described repeated efforts of former generations to influence tuberculosis by treatment with products of antagonistic micro-organisms. Still other efforts are recorded in Dr. Selman Waksman's book *Microbial Antagonisms and Antibiotic Substances,** and search of the literature has revealed still others, so that at least a score or more of products of bacterial growth have been recorded as demonstrating in one way or another some effects on the bacillus of tuberculosis. Undoubtedly, there are many others in nature, and active search for them is continuing. In January, 1944, Schatz, Bugie and Waksman described a substance called "streptomycin," which demonstrated activity against a number of micro-organisms which were not affected by penicillin. Among these was the tubercle bacillus. Dr. Waksman kindly agreed to supply Dr. Feldman and me with a sufficient quantity of the drug to study its effect on tuberculosis in guinea pigs. Neither he nor we held any high hopes of success at the time; because of the fact that so many substances were known to be effective on cultures of tubercle bacilli and so few of these had similar effect on the disease in the animal body. Had it not been for this splendid co-operation on the part of Dr. Waksman, it is probable that streptomycin would be a test-tube curiosity today, because certainly the odds were at that time against its development into a practical therapeutic agent for the treatment of disease in the human being. Furthermore, these studies never would have been undertaken had not previous experience with sulfone drugs in experimental tuberculosis convinced us that this was the proper approach to the problem.

Extensive studies carried out in Dr. Feldman's laboratory and elsewhere have now shown that streptomycin is capable of overcoming experimental tuberculosis in guinea pigs, even when the experimental conditions are most difficult. Even when massive doses of tubercle bacilli are injected intravenously in such a manner that animals ordinarily would die within a matter of two to four weeks, the animals can be saved in a large proportion of instances by treatment with streptomycin. It has been shown, also, that the disease may be permitted to attain an advanced stage of development in guinea pigs, prior to institution of treatment, and that the drug still will be effective. It has also been shown that streptomycin may be employed effectively in the treatment of experimental tuberculosis of guinea pigs, even though a reasonably constant quantity of the agent is not maintained in the blood, even when only one injection per twenty-four hours is carried out. By means of these experiments and others, it is thoroughly well established that streptomycin is the most effective substance which has yet been employed in the treatment of experimental tuberculosis in guinea pigs.

As stated before, streptomycin was first announced in January, 1944; the preliminary studies with guinea pigs were started in April, 1944; the crucial studies were instituted in July, 1944, and by late autumn, 1944, the first test doses were administered to human beings who had tuberculosis. At first, patients were selected whose prognosis appeared so grave that any risk appeared to be justified, and in every instance the situation was very carefully explained and the patient's consent to the use of a previously untried drug was obtained. In this way we were able to study the pharmacology of streptomycin; its absorption, excretion, distribution in the tissues, the relationship between dosage and blood level, and the principal manifestations of toxicity. Early in 1945 sufficient information was obtained so that the drug could be used intelligently and with reasonable safety. We have since had about two years' experience in the treatment of clinical tuberculosis with streptomycin, and somewhat more than 100 patients have been studied for periods in excess of six months at the Mayo Clinic, Mineral Springs Sanatorium, and the Rochester State Hospital (in collaboration with Dr. Magnus Peterson).

Tuberculous meningitis and miliary tuberculosis generally are recognized as uniformly fatal diseases which cannot be modified in any way by treatment. However, streptomycin is capable of bringing about a temporary or prolonged remission of the symptoms and physical signs in a majority of cases of tuberculous meningitis and miliary tuberculosis. Undoubtedly, results are far superior and sequelae may be minimized or avoided if treatment is instituted early in the course of the disease. When meningitis is present, streptomycin must be given by the intrathecal route as well as by intramuscular injection. Unfortunately, the clinical, roentgenographic and bacteriologic remission produced is not always sustained, and if the disease recurs as a result of drug-fast strains of the tubercle bacillus, repeated therapy may not be effective. My associates and I have now treated twelve patients with miliary tuberculosis and tuberculous meningitis, and four of these are still living and apparently well one year or more after the disease was diagnosed and six months or more after treatment was discontinued. We do not believe that these patients should be regarded as cured until one year has elapsed since treatment was discontinued. These results are sufficiently unprecedented and sufficiently promising to lead us to the conclusion that all patients with tuberculous meningitis and miliary tuberculosis should be treated with streptomycin in maximal doses, now that the drug is generally available.

In pulmonary tuberculosis, even severe symptoms frequently are abated within a few weeks. Roentgenographic improvement is slower in realization; it usually requires two or three months. Eradication of the organisms from the sputum frequently is not attained in patients who have lesions of the fibrocaseous type, especially if thick-walled cavities are present. In these latter instances, streptomycin therapy certainly should be followed by surgical treatment for the collapse of such cavities, if feasible. The most promising results obtained from the treatment of pulmonary tuberculosis with streptomycin have been observed in lesions of the exudative type which recently appeared and were progressive at the time treatment was instituted. Even when such acute lesions are very extensive, and even in clinical circumstances which appear to be very unfavorable as to prognosis, apparent arrest of the disease has been accomplished in some instances.

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*Published by the Commonwealth Fund, 1945.

The treatment with streptomycin of minimal and moderately advanced pulmonary tuberculosis, which might be expected to abate on a conventional therapeutic regimen, has not as yet been employed in a sufficient number of cases to permit the formation of conclusions, and it is doubtful if such treatment is justified until such time as the toxic potentialities of streptomycin may be modified or overcome.

In the treatment of tuberculosis of the genito-urinary tract, my urologic colleagues* and I have come to regard this as a drug which frequently yields palliative benefit and in a minority of patients may lead to prolonged remission of symptoms, even when the tuberculous bacilluria is not permanently controlled. Unquestionably, longer observation will be required before it can be stated that streptomycin is capable of curing any instance of renal tuberculosis. In the meantime, I am sure that any patient with unilateral renal tuberculosis who might be a candidate for surgical treatment should not fail to accept such treatment.

Draining sinus tracts of tuberculous origin related to tuberculous lymphadenitis, to tuberculosis of the thoracic wall, and to some types of tuberculosis of bones and of joints, frequently have closed promptly after treatment with streptomycin. If such treatment is discontinued at an early stage, it appears that circumstances are favorable for recurrence of these lesions; but if treatment with streptomycin is continued for several weeks, permanent arrest of such disease apparently can be achieved.

The treatment with streptomycin of such unusual forms of tuberculosis as tuberculous infections of the eye, tuberculosis of the skin, some varieties of tuberculosis of bones, tendons and joints, and tuberculous empyema will require further study before the place of streptomycin in the treatment of these diseases is fully established.

It has not yet been determined what the minimal therapeutic dose of streptomycin is, what the maximal tolerated dose for prolonged therapy may be, what the optimal frequency of injection may be, or how long treatment need, of necessity, be continued. These and many other problems must await the completion of large-scale studies which are now under way under the auspices of the American Trudeau Society, the Veterans Administration, and the Tuberculosis Study Section of the National Institute of Health. All these studies are being co-ordinated, and each worker is fully apprised of the findings of all others. This concerted attack on the problem, bringing to bear the efforts of many investigators in the study of hundreds of patients, surely will yield prompt answers to many problems in a minimal period of time.

SUMMARY

Methods have been developed which permit the assay of antibacterial substances against Mycobacterium tuberculosis in experimental animals.

The derivatives of sulfanilamide have been studied adequately to demonstrate that their action against the bacillus of tuberculosis is too feeble to arrest the progress of tuberculosis in guinea pigs or human beings.

The derivatives of diaminodiphenylsulfone have been extensively studied, and several substances have been found which are fully capable of arresting advanced experimental tuberculosis of guinea pigs. Unfortunately, these drugs are too toxic to be practical for the treatment of most forms of tuberculosis of man. However, in leprosy, sulfone drugs are proving themselves to be effective and practical, and are yielding results unprecedented in the treatment of this most stubborn disease. The results of the treatment of leprosy with sulfone drugs may be regarded as a direct outgrowth of studies of the use of sulfone drugs in experimental tuberculosis.

The bacillus of tuberculosis is susceptible to the action of several antibiotic substances when the bacillus is growing in cultures; at least one of these, streptomycin, is highly effective in experimental tuberculosis of guinea pigs, and may be regarded as the most effective of all antibacterial substances which have been employed in the treatment of experimental tuberculosis of animals.

Streptomycin is the first antibacterial substance effective against the tubercle bacillus which can be administered to man in doses which are fully equal to those tolerated by experimental animals when computed according to body weight.

The results of treatment with streptomycin in clinical tuberculosis appear to be just those which should be anticipated if the substance has a suppressive effect on the organism of tuberculosis, when actual contact between the drug and the bacterium can be achieved and maintained. Let me emphasize again that these results do appear to be suppressive rather than curative, but, fortunately, the human body has sufficiently potent defensive mechanisms to be able to overcome tuberculosis if only moderate aid be supplied by such methods of treatment as this.

Serious limitations to any antibacterial treatment of tuberculosis are imposed by the pathology of the disease itself, which produces destructive lesions that become irreversible in many organs if treatment is long delayed. Even under these circumstances, there is frequently witnessed a palliative effect of treatment of at least temporary duration.

Other limitations are imposed by the inability of streptomycin to penetrate into the substance of the brain. Patients with miliary tuberculosis have died with evidence of healing of their disease in most organs of the body with the notable exception of lesions in the brain, where the drug has been found to fail in penetration.

Streptomycin therapy probably is further limited as to duration of effective action because of the appearance of drug-fast strains of bacteria after several months of treatment. Fortunately, however, the duration of effective action is sufficient to realize the desired therapeutic effect in many clinical circumstances. In many other clinical circumstances it appears possible that streptomycin may be of sufficient temporary value to permit the institution of radical surgical procedures which could not otherwise have been employed.

The way now appears to be cleared toward steady progress in the development of ever more effective alternative antibacterial agents in the treatment of tuberculosis.

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*Dr. E. N. Cook and Dr. L. F. Greene.

This subject must never be discussed without repeated emphasis of the fact that sanatorium care, collapse therapy and radical surgery very frequently are effective in tuberculosis. These methods of treatment have been fully proved and frequently are applicable to tuberculosis when streptomycin is not. It thus becomes obvious that serious harm to patients might result if they refuse or postpone these known effective types of treatment in the hope that this or some other drug might offer an earlier, more rapid or more permanent result. Very frequently, such patients not only will be disappointed but possibly they may lose all chance of recovery by failing to accept sanatorium care, collapse therapy or surgical treatment when these have been advised.

FIFTH ANNUAL JOURNAL-LANCET LECTURE

The 5th Annual JOURNAL-LANCET Lecture, sponsored by the University of Minnesota Medical School, will be delivered by Professor Georg von Hevesy on April 29 at 8:15 P.M. in the auditorium of the Museum of Natural History.

Professor George von Hevesy was born in Budapest in 1885 and was educated in the universities of Budapest, Berlin, and Freiburg. His researches have brought him into close contact with such famous scientists as Haber at Karlsruhe, Rutherford at Manchester, and Donnan at Liverpool. The X-ray investigation with Dr. Coster which resulted in the discovery of hafnium was carried out while both were connected with Bohr's Institute of Theoretical Physics at Copenhagen. Professor von Hevesy taught for a time as professor of physical chemistry at the University of Freiburg. In 1930 he served as the George Fisher Baker Non-Resident Lecturer in Chemistry at Cornell University. His researches have been in the fields of physical chemistry, electrochemistry, radioactivity, and the separation of isotopes. He was the Nobel Prize Winner in Chemistry in 1944.

Hafnium had lain hidden for untold centuries, not because of its rarity but because of its close similarity to zirconium, and when Professor von Hevesy examined some historic museum specimens of zirconium compounds which had been prepared by Julius Thomsen, Rammelsberg, Nordenskjöld, Marignac, and other experts on the chemistry of zirconium, he found that they contained from one to five per cent of the new element. The latter is far more abundant than silver or gold. Since the earlier chemists were unable to prepare zirconium compounds free from hafnium, the discovery of the new element necessitated a revision of the atomic weight of zirconium.

Professor Hevesy wrote *Chemical Analysis by X-rays and Its Applications* in 1930, *Radioactivity* in 1938, and altogether has written over 100 journal articles on the use of radioactive isotopes in the study of metabolic processes such as (a) the metabolism of bone, (b) turnover of phospholipids by liver and blood cell, (c) measurement of the life of red blood cells, (d) determination of blood volume.

It is of interest to remark that Professor Hevesy, whose original career was that of a physicist, became a leader in biochemical investigations when the artificial radioactive isotopes became available.

He is now associated with Professor Niels Bohr of the University of Copenhagen. During the occupation of Denmark by the Germans, Professor Hevesy escaped from that country to Sweden where he continued his work.

TUBERCULOSIS DEATH RATE IN 1946

The crude death rate from tuberculosis in 1946 remained on the same level as in the year before, but when adjustment is made for the aging of the policyholders the mortality from this cause likewise declines to a new low. The record for the year would have been even more favorable had it not been for the epidemic of respiratory diseases at the beginning of the year which brought with it a considerable, though temporary, increase in tuberculosis mortality. For example the death rate from tuberculosis in the first two months of the year was about 13 per cent above the corresponding rate in 1945. Fortunately, this increase was offset by a low mortality in succeeding months.—*Statistical Bulletin, Metropolitan Life Insurance Company,* January, 1947.

Tuberculosis Among College Students

Sixteenth Annual Report of the Tuberculosis Committee, American Student Health Association, for the Academic Year, 1945-1946

As our veterans returned from the theatres of war it was predicted that enrollments in American colleges and universities would be vastly increased, especially after the passage of Public Laws 346 and 16. Attesting to the correctness of this prediction, much has occurred in academic circles since the "V" days. Trailer camps and Quonset villages have sprung up around many a college campus. Registration has been closed to additional students in some colleges because enrollments were already larger than available facilities would accommodate. It has even been necessary to establish new colleges to take care of the education-hungry hordes. Students are commuting each day, sometimes for over a distance of fifty miles, because the housing shortage, acute over the entire nation, is even worse in most college towns.

Student health workers were apprehensive lest this sudden rush of new students, and former ones who returned to complete their education, should force curtailment in some of the health services offered students. Doctors, nurses and other personnel appeared to be no more plentiful than during the war and there was no evidence that such personnel would be available in numbers sufficient to meet the demands of this emergency. It was thought that special activities, of which tuberculosis control is an example, might be the first to feel the effect of these adverse conditions.

Replies to the 1945-46 questionnaire of the tuberculosis committee have, for the most part, laid these fears to rest. Study of the tables accompanying this report shows clearly that not only have tuberculosis programs been maintained at a reasonably high level of efficiency, but that all sections of the country have shown an increase in the number of colleges conducting tuberculosis surveys. It is true that some states show a reduction in number of colleges reporting programs. Our data do not show the reason for this decline but it is none the less true that coverage of the United States has been fairly complete. Only three states failed to show any programs whatever. Twenty-nine states, including the District of Columbia, listed increases in the number of colleges reporting programs, while ten states showed losses and in ten more there is no change over the previous year. (See Tables 1 and 2.)

The questionnaire was sent to 883 colleges, two less than the preceding year, and replies were received from 507 colleges, an increase of 46 over replies received in 1944-45. Of greater importance is the fact that 50 more colleges reported tuberculosis control programs.

The 507 colleges which answered this year's questionnaire reported 513 cases of tuberculosis among their students *of these* 508 *were found at colleges reporting some type of program.*

The number of students with arrested disease who are now back in college able to resume their careers was 698. Special attention is called to this latter statement because of the added hope it should give the tuberculous who have found it necessary to interrupt a career while "taking the cure."

TABLE 1

Colleges Sent Questionnaire, Replies Received and Programs Reported in the Questionnaire Survey of American Colleges and Universities, Classified by Division and State: Year Ending June 30, 1946

Division and state	Colleges sent questionnaire	Replies received	Programs reported	Annual increase (+) or decrease (—) in programs reported
United States	883	507	362	+50
New England	84	49	42	+ 6
Maine	8	5	4	+ 1
New Hampshire	7	4	4	+ 2
Vermont	9	7	4	+ 3
Massachusetts	43	21	19	— 1
Rhode Island	5	5	4	+ 1
Connecticut	12	7	7	—
Middle Atlantic	150	89	71	+ 4
New York	69	41	33	+ 1
New Jersey	18	13	11	— 1
Pennsylvania	63	35	27	+ 4
East North Central	169	110	87	+ 7
Ohio	46	26	21	— 1
Indiana	27	21	16	+ 3
Illinois	44	29	22	+ 6
Michigan	25	12	10	— 5
Wisconsin	27	22	19	+4
West North Central	127	88	57	+ 5
Minnesota	22	19	19	+ 1
Iowa	26	17	8	+ 4
Missouri	25	21	9	+ 3
North Dakota	9	6	5	+ 2
South Dakota	8	2	1	— 1
Nebraska	16	10	5	— 1
Kansas	21	13	10	— 3
South Atlantic	118	66	41	+ 9
Delaware	1	—	—	—
Maryland	16	7	4	—
District of Columbia	9	4	4	+ 2
Virginia	18	9	7	+ 3
West Virginia	14	13	9	+ 4
North Carolina	22	15	7	— 2
South Carolina	15	7	5	—
Georgia	16	7	3	+ 2
Florida	7	4	2	—
East South Central	66	22	10	+ 4
Kentucky	17	6	4	+ 2
Tennessee	27	8	2	+ 1
Alabama	13	3	1	—
Mississippi	9	5	3	+ 1
West South Central	72	26	12	+ 1
Arkansas	11	5	4	+ 2
Louisiana	13	6	2	— 2
Oklahoma	16	6	3	—
Texas	32	6	3	+ 1
Mountain	32	18	11	+ 3
Montana	6	4	2	—
Idaho	3	2	1	+ 1
Wyoming	1	1	1	—
Colorado	9	5	4	+ 2
New Mexico	5	3	—	—
Arizona	3	2	2	+ 2
Utah	4	—	—	— 3
Nevada	1	1	1	+ 1
Pacific	65	39	31	+11
Washington	16	7	5	+ 1
Oregon	14	12	9	+ 4
California	35	20	17	+ 6

TABLE 2

Number and Percentage of American Colleges and Universities Which Answered Questionnaire and Percentage of Those Answering Which Reported Programs, Classified by Academic Year.

Academic Year Ending June 30	Colleges Sent Questionnaires	Replies Received		Colleges Which Reported Programs	
		Number	Per Cent of Colleges Sent Questionnaires	Number	Pct. of Replies Received
1946	883	507	57.4	362	71.4
1945	885	461	52.1	312	67.7
1944	886	400	45.1	286	71.5
1943	879	398	45.3	267	67.1
1942	860	488	56.7	311	63.7
1941	854	483	56.6	304	62.9

SUMMARY OF PROGRAMS REPORTED BY 362 COLLEGES

1. *Colleges reporting tuberculin testing programs*:

One hundred ninety-eight colleges, representing a total student enrollment of 364,541, reported using the tuberculin test in some form as their initial screening method. Since 13 of the colleges reported incomplete or imperfect data concerning the tests made, and since one report came from a medical school where students are older and where risk of exposure is much greater, the figures relating to students tested and reactors* found are based on the reports of 184 colleges representing a student enrollment of approximately 339,553.

The committee continues to recommend the use of the tuberculin test as the ideal screening method for a tuberculosis control program. Preferably, this test is accomplished with Purified Protein Derivative of tuberculin (P.P.D.) given in two strengths by the method of Mantoux. It has long been recognized that many colleges have difficulty in fitting this ideal method into the structure of their health service program.

The tuberculosis control system employed by a given college must of necessity be modified according to the local situation.[1] Rarely are two colleges alike in the detailed administration of collegiate activities which influence the operation of the student health service. Details of registration, requirements for continued residence and scheduling of physical examinations are such that some colleges cannot, physically, line up the student body with sufficient organization to carry out the ideal method of tuberculin testing. Further difficulty is encountered when it becomes necessary to re-test those students not reacting to the first strengh of P.P.D. However, as variations in techniques for tuberculosis control programs are published in these yearly reports we trust that health services will constantly try to improve their methods, taking the experience of others as a guide. (See Table 3.)

Certain of the techniques reported are mentioned only to condemn them as unsatisfactory and unproductive of desired results. Some of them might even defeat the recognized objectives of a tuberculosis control program. We believe these objectives to be: first, the discovery of and elimination from the campus environment of all cases of active tuberculosis; second, the determination of the incidence of tuberculous infection in this important population segment—the college student.

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* Reactor and non-reactor are now preferred to the terms positive and negative.

TABLE 3

Techniques Used in Tuberculin Testing Programs in 171 Colleges, Showing Number of Colleges Using Each Technique

Note: On the reverse side of the questionnaire a request was made that the information be furnished by the college physician only. Twenty-seven colleges left this side completely blank; others did not abide by this request. Hence, only 171 colleges are accounted for in the following statistics.

Testing method:	
Mantoux intradermal	115 colleges
Vollmer patch test	52 colleges
Combination Patch and Mantoux	3 colleges
Scratch test	1 college
Testing material (exclusive of Vollmer):	
Purified Protein Derivative	65 colleges
Old tuberculin	47 colleges
Unspecified	4 colleges
Combination P.P.D. and O.T. (One of the large universities used P.P.D. for large groups and O.T. for individuals)	2 colleges
Testing dosage:	
Two-dose technique	32 colleges
Single large dose	16 colleges
Single intermediate dose	29 colleges
Single small dose	22 colleges
Single dose-strength not specified	11 colleges
Unspecified	8 colleges
Testing routine:	
All new students, non-reactors annually or oftener	68 colleges
Freshmen and new students only	48 colleges
All students	6 colleges
New students and seniors	5 colleges
New students and non-reacting seniors	9 colleges
Optional	12 colleges
Unspecified	14 colleges
Other testing routine*	9 colleges
Routine for X-raying reactors:	
Reactors filmed annually (or oftener)	94 colleges
Reactors filmed once only	40 colleges
X-ray optional	6 colleges
Unspecified	7 colleges
Other X-ray routine†	24 colleges

*Three colleges reported the testing of new students, making the test optional for others. Three colleges tested new students plus more frequent testing of other selected groups (medical, dental and nursing students, physical education majors, athletes, suspects, contacts, and those with a history of pleurisy, tuberculosis, etc.)

Seventeen colleges reported routine X-raying in addition to testing; some X-rayed new students and other groups only, while five X-rayed the entire student body. One college indicated testing of new students and juniors, another tests juniors and seniors only, and one tests new students and non-reacting sophomores and juniors.

†Two colleges test all new students, X-ray the reactors at that time and again when they are seniors. One school X-rays reactors only "when indicated." Two colleges refer reactors to their family physicians for X-ray. Four X-ray only if advised to do so by the college physician or if desired by the reactor.

Seven colleges report the routine use of fluoroscope on reactors; of these, four fluoroscope reactors annually and require X-rays of those with suspicious findings while the remaining three fluoroscope reactors only once but require an X-ray should the finding warrant it. One college X-rays female reactors only, making it optional for male students. Among these 24 are included colleges which both test and X-ray; two X-ray all new students and five X-ray the entire student body.

Three of the colleges which X-ray reactors once only, recheck medical, dental and nursing students annually and sometimes as often as every three months. One medical school tests its students every six months and requires an X-ray of reactors every six weeks until they have had three. They are then X-rayed every six months.

TABLE 4

Male and Female Students Tested in 133 Colleges and Number and Percentage of Reactors, Classified by Technique Used: Year Ending June 30, 1946

Technique Used	Students tested in 133 colleges			Reactors					
	Both[1] Sexes	Male	Female	Number			Per cent of total		
				Both[1] Sexes	Male	Female	Both[1] Sexes	Male	Female
All techniques	97,938	48,981	39,725	17,735	11,001	5,351	18.1	22.5	13.5
Patch Test	22,334	8,649	10,192	3,729	2,043	1,190	16.7	23.6	11.7
P.P.D.	39,953	22,057	15,423	9,093	5,675	2,880	22.8	25.7	18.7
Two Dose	15,966	8,160	6,985	4,251	2,511	1,414	26.6	30.8	20.2
Single Intermediate	13,307	8,907	3,855	2,405	1,714	585	18.1	19.2	15.2
Single Small	3,410	2,458	952	744	655	89	21.8	26.7	9.4
Single Large	7,270	2,532	3,631	1,693	795	792	23.3	31.4	21.8
Old Tuberculin	35,651	18,275	14,110	4,913	3,283	1,281	13.8	18.0	9.1
Two Dose	9,093	5,960	2,781	1,103	938	127	12.1	15.7	4.6
Single Intermediate	5,993	1,935	3,074	863	374	333	14.4	19.3	10.8
Single Small	17,864	10,343	7,522	2,705	1,967	738	15.1	19.0	9.8
Single Large	2,701	37	733	242	4	83	9.0	10.8	11.3

NOTE: Although 198 colleges and universities reported tuberculin testing routines in 1945-46, only the findings of 133 institutions are included in this table. Excluded are 60 schools which reported incomplete or inaccurate information, three that used a combination of more than one technique, one which reported use of the Scratch test and one medical school.

1. The discrepancy between the totals shown for both sexes and the total of male and female is due to the fact that some colleges reported total students tested and total student reactors but did not report breakdown by sex.

TABLE 5

Male and Female Students Tested in 184 Colleges and Number and Percentage of Reactors, Classified by Geographical Division Year Ending June 30, 1946

Geographical Division	Students tested in 184 colleges			Reactors					
	Both[1] Sexes	Male	Female	Number			Per cent of total		
				Both[1] Sexes	Male	Female	Both[1] Sexes	Male	Female
United States	127,511	59,275	50,216	22,391	13,286	6,809	17.6	22.4	13.6
New England	2,992	1,618	1,374	819	569	250	27.4	35.2	18.2
Middle Atlantic	8,618	4,009	3,846	1,647	1,083	500	19.1	27.0	13.0
East North Central	34,071	13,872	14,674	5,657	3,212	1,826	16.6	23.2	12.4
West North Central	35,753	17,922	14,066	5,369	3,099	1,752	15.0	17.3	12.5
South Atlantic	11,996	5,792	3,408	1,954	1,236	387	16.3	21.3	11.4
East South Central	4,272	1,826	837	1,048	585	104	24.5	32.0	12.4
West South Central	7,176	3,752	2,281	814	500	280	11.3	13.3	12.3
Mountain	4,904	1,360	1,863	685	250	191	14.0	18.4	10.3
Pacific	17,729	9,124	7,867	4,398	2,752	1,519	24.8	30.2	19.3

NOTE: Although 198 colleges and universities reported tuberculin testing routines in 1945-46, only the findings of 184 institutions are included in this table. Thirteen schools were excluded because they reported inaccurate or incomplete information and one was a medical school.

1. The discrepancy between the totals shown for both sexes and the total of male and female is due to the fact that some colleges reported total students tested and total student reactors but did not report breakdown by sex.

When a college reports a tuberculin testing program but leaves the decision for X-ray of reactors up to the student who reacts, or when the decision to X-ray a reactor is made on such an obscure basis as "appearance of the reactor," "history of exposure," or "contact," many actual cases of tuberculosis will be missed. Many a student, by any other standard the picture of health, has been found to have minimal tuberculosis when the discovery of his reaction to tuberculin was unquestioningly followed by a chest X-ray.

At least one college follows the advice of the college physician as to which reactors need X-ray. This committee knows of no method that has ever been devised to determine that a tuberculin reactor does *not* need a chest X-ray. A decision not to X-ray all reactors violates a corollary of one of the objectives mentioned. We must find cases of active tuberculosis, yes, but we must find them early, when chances for recovery are optimum and, if possible, before they become communicable.

The tuberculosis control program recommended by this committee includes, in addition to the initial testing of all new students and X-ray of reactors, the annual repetition of the test on all previous non-reactors and annual X-ray for all reactors. Only thus will the maximum number of cases of tuberculosis be discovered at the earliest possible time. Likewise, only then shall we be able to demonstrate the maximum number of students infected with the germ of tuberculosis.

Only 127,511 students out of a total of 364,541 enrolled in the colleges reporting tuberculin testing programs, were said to have been tested during the 1945-46 school year. Of these, 22,391 or 17.6 per cent were reported as reactors. Some of the 237,030 students who were evidently not tested were undoubtedly known reactors as the result of previous tests, performed during their first year in college. A number of non-reactors will, however, become reactors during their college years. One authority designates these new reactors as "converters" and believes they are in special need of careful observation for a period of several years.[2]

TABLE 6

Cases of Tuberculosis Found in Colleges with Tuberculin Testing Programs, in Those with X-ray Programs Only, and in Those with No Tuberculosis Programs, Classified by College Group and Disposition of Cases

College group and disposition of cases	Cases found in 198 colleges with tuberculin testing programs (enrollment 364,541)	Cases found in 164 colleges with basic X-ray programs (enrollment 256,178)	Cases found in 145 colleges with no tuberculosis programs (enrollment 82,960)
Student body	231	277	5
Students who have withdrawn from college	106	150	7
Believed to have entered sanatoria	72	98	4
Believed to be under treatment at home	21	25	3
Details of treatment not reported	13	27	—
Faculty, administrative staff, etc.	22	31	—
College food handlers	17	14[1]	—
Other college employees	22[2]	20[1]	—
Students now back in college with arrested disease, previously diagnosed	411	273	14

1. Included in this number are 3 cases specified as "arrested."
2. Included in this number are 6 cases specified as "arrested."

Table 4 is included in this report to show the comparative results in percentage of tuberculin reactors found by the various techniques employed. Table 5 indicates the percentage of reactors found among college students tested in the several geographical areas of the United States. Perhaps no definite conclusions should be drawn from these tables at this time. Compilation and publication of similar figures each year may at some future time serve as an index of the value of tuberculosis control measures in general.

2. *Colleges reporting basic X-ray programs*:

The 164 colleges in this group represent a total student enrollment of approximately 256,178. Two of the colleges use the fluoroscope routinely for the screening process. An additional two included in the above total are medical schools. The total represents another increase in the number of colleges using this type of program as compared to the previous year when 121 colleges reported using the X-ray alone. (See Table 6.)

The year-to-year increase in number of colleges employing the X-ray alone as their screening method, despite the repeated contention of the committee on tuberculosis that a tuberculin testing routine is better, calls for some word of explanation. Evidence seems to point to the fact that very few colleges are changing from a well-established tuberculin testing program to one using the X-ray alone. Nor is the opposite the case. Colleges which have always depended upon the X-ray for screening their students seem reluctant to abandon this less time-consuming routine. What has occurred is that those colleges which recently have established tuberculosis control programs seem to have been influenced in favor of the X-ray type of program.

Reasons for this decision seem to be quite obvious. Almost all the nationally advertised slogans designed to emphasize the importance of early diagnosis, or for that matter, the diagnosis of pulmonary tuberculosis at any stage, advise the reader to get a chest X-ray. The tuberculosis control programs for the armed forces as they were finally established shortly after war was declared, were based on the plan of screening inductees by one or the other of the most widely publicized miniature film techniques. Surveys of thousands of industrial workers during the past few years have been accomplished almost exclusively by X-ray methods.

TABLE 7

Techniques Used in Basic X-ray Programs, Showing Number of Colleges Using Each Technique

Note: On the reverse side of the questionnaire a request was made that the information be furnished by the college physician only. Forty schools left this side completely blank. Hence, only 124 colleges are accounted for in the following statistics.

X-ray routines reported:	
X-ray new students only	30 colleges
X-ray all students annually	34 colleges
X-ray all students	9 colleges
X-ray new students and seniors	20 colleges
X-ray new students and juniors	2 colleges
X-ray optional for students	7 colleges
Require new students to submit X-rays before entrance	2 colleges
Fluoroscope used for screening purposes	2 colleges
Special groups only (student teachers)	1 college
Routine not reported	17 colleges

Eleven colleges which X-ray new students only, re-X-ray suspects and arrested cases as often as indicated. One college in this group X-rays its medical students annually and two schools use the tuberculin test for differential diagnosis.

Seven colleges that X-ray new students and seniors, X-ray students with questionable radiological findings annually or oftener. Two colleges in this group X-ray special groups of students such as physical education, education and nursing students more often.

Two colleges which X-ray all students annually are medical schools that test as well as X-ray second year and non-reacting fourth year students. An additional school in this group uses the tuberculin test in differential diagnosis.

The one college that X-rays student teachers only is a teachers college; this group represents approximately 25 per cent of the entire student body.

One college which requires new students to submit X-ray films prior to entrance, re-X-rays at the college students with questionable findings on the submitted films.

One college which uses the fluoroscope for screening, X-rays students with positive findings and in addition X-rays their medical students annually.

The above mentioned programs for the control of tuberculosis are designed for the purpose of screening out *cases* of this disease. This is but one of the admitted objectives of a tuberculosis control program in an American college or university, albeit a very important one. No college which employs X-ray alone in the initial screening of its students can contribute to our knowledge of the extent of tuberculous infection. In fact, only 34, or perhaps 43 colleges should expect to find even that number of tuberculous students which the X-ray may indicate as suspicious. Of these 43 colleges, 34 report that they

X-ray all students annually, while 9 report that they X-ray "all students" without exact statement as to frequency.

We can only commend another factor which is probably contributing to the number of colleges reporting the use of the X-ray alone. Many colleges, especially those with smaller enrollments, have been unable to develop an organized program for tuberculosis control. This lack has been called to the attention of official and non-official health agencies having one of these colleges within their jurisdiction. Some of these health agencies which possess portable or mobile photo-fluorographic X-ray units have given practical help through survey of entire student bodies, including faculty and other campus personnel.

TABLE 8

Number and Percentage of American Colleges and Universities Which Answered the Questionnaire and Which Reported Programs, Classified By Student Enrollment: Years Ending June 30, 1944-45 and 1945-46

Student Enrollment	Colleges Reporting 1945-46			Colleges Reporting 1944-45		
	Total	With Programs		Total	With Programs	
		Number	Per Cent of Total		Number	Per Cent of Total
All colleges	507	362	71.4	461	312	67.7
Colleges with:						
Fewer than 500 students	241	148	61.4	263	161	61.2
500 but less than 1000 students	120	86	71.7	97	71	73.2
1000 but less than 2000 students	73	61	83.6	41	33	80.5
2000 but less than 4000 students	39	34	87.2	44	33	75.0
5000 and over	34	33	97.1	16	14	[1]

NOTE: Number of students enrolled in American colleges and universities cooperating in the tuberculosis survey for 1944-45 was 468,016; for 1945-46 the number enrolled was 703,679.

Per Cent not computed when base is less than 25.

Variations in X-ray policy are listed in Table 7. Credit has already been given to those colleges which X-ray all their students annually. Other X-ray methods set forth in this table are mentioned for the same reason that attention was called to some of the tuberculin testing routines —trusting their inadequacy would be appreciated and that attempts would be made to improve the tuberculosis programs in these colleges. When X-ray is offered but made optional, or when students are X-rayed when "indicated," many cases of tuberculosis will be missed. The optimum time to find a case of tuberculosis is when it is least suspected by either the doctor or the patient. It is fairly well known that a case may be quite advanced before signs or symptoms cause suspicion that tuberculosis might be present.

An occasional progressive college is using both the tuberculin test and the X-ray for screening all new students. The committee believes this combination method to be of extreme value. We would even accept it as the ideal program for colleges equipped physically and financially to carry it out. Such a program at once silences one group of critics of the present ideal program who maintain that non-tuberculous chest pathology is missed if only the chests of tuberculin reactors are X-rayed.

3. *Colleges reporting no tuberculosis programs*:

This group included 145 colleges representing a total student enrollment of approximately 82,960. (See Table 6.) Of these 145 colleges, 88 per cent have a student enrollment of less than 1,000 students. The attention of workers in the official and voluntary health agencies is called to this point especially. An excellent job has been done by some of these health agencies. Much is yet to be done. Through the interest, cooperation and assistance of these workers, tuberculosis programs may be initiated in some of the country's smaller colleges where, without such help, it may be years before a program is developed.

We should like to suggest, however, that colleges without tuberculosis programs be persuaded to inaugurate one with sound health education as the persuading force. It is very likely that no case of actual tuberculosis will be found at a given small college of a few hundred students. Unless the college authorities know and understand the whole story of tuberculosis—the subtlety and chronic nature of the infection—they may not be impressed by the program for which they have given their consent. Several are already of the opinion, as reported on some of our questionnaires, that "there is no need of having tests and to their knowledge the college has never had a student who had tuberculosis."

We compare once more the number of cases of tuberculosis found by organized effort with the number found when not especially looked for. Approximately 82 cases per 100,000 students enrolled were discovered at those colleges reporting programs. Slightly over 6 cases per 100,000 students enrolled were reported from colleges having no programs.

TUBERCULOSIS AMONG STUDENT-VETERANS

Compared with the 1945-46 school year, relatively few veterans were enrolled in American colleges and universities for the greater part of the 1944-45 academic year. Rumors came from various agencies that an occasional tuberculous veteran had apparently not shown evidence of disease on his discharge X-ray. The question was also raised as to whether or not some veterans might develop tuberculosis as a result of exposure to the disease in some of the theatres of war where the incidence of tuberculosis was known to be very high. As a consequence, in our report for 1944-45 it was suggested that veterans returning to college should enter the tuberculosis control program of the college of their choice on exactly the same basis as any other student.[3]

There is no way of determining how many of the 620,719 students attending colleges with some type of tuberculosis control program were veterans. It is reasonable, however, to assume that many students were veterans because this total of students is 254,221 more than were reported enrolled in 1944-45. Perhaps some veterans are included in the 237,030 students who were not tested at those colleges reporting tuberculin testing programs.

Eight colleges specifically mentioned that they were *excluding* veterans from their tuberculosis control programs because of recent screening upon separation from the service. On the other hand, some colleges have put special emphasis on the veteran. One large western university reported discovering a total of 25 cases of tuberculosis in the total student body, of which 18 were among male students. *All 18 were veterans!*

Another western university submitted an excellent report of its tuberculosis control program for veterans. Five veterans, all males, withdrew from the university for treatment of tuberculosis discovered in the university's survey program, though 3 of these had been discharged from the service with diagnoses of arrested tuberculosis. Five other male veterans showed questionable tuberculosis though the diagnosis had not yet been verified at the time of the report. One female veteran was discovered with a lesion that was diagnosed as "unstable, minimal," and in another the diagnosis had not yet been established. Altogether, 36 veterans were found with chest pathology suggestive of pulmonary tuberculosis.

Inclusion of Non-Student Campus Personnel in Tuberculosis Control Programs

All employees of all college departments may be included under the heading of "non-student campus personnel." This term applies to everyone employed by the college who might have direct or indirect contact with members of the student body.

College administrators have had called to their attention the futility of attempting to protect a student from tuberculous infection by examining his fellow students only. In order to make further gains in our campaign to stamp out this unnecessary disease, we must consider everyone a suspect until freedom from tuberculosis has been demonstrated in all. The committee believes, of course, that non-student participants in the college program should be surveyed by the tuberculin testing and X-ray type of program.

Most colleges reporting inclusion of non-students in their answer to the questionnaire indicate use of the same type of program for non-students as is used for students. Some apparently believe that less frequent survey of this group is necessary, basing the time interval more or less arbitrarily on the age of the employee. Regarding this, we wish to call attention to statistical evidence pointing toward an increase in the average age of tuberculous patients. The highest death rate from tuberculosis now occurs among men in the age group of 45 years and over. It is reasonable to assume that the number of cases in this group is likewise high.

In Conclusion

Tuberculosis control, like other branches of medicine, is becoming a highly specialized and scientific endeavor. The tuberculosis committee is aware, as suggested elsewhere,[4] that as the final answer to the scientific control of this disease draws near, differences of opinion will become more sharply defined. For this reason, we of the committee, who are from the ranks of health service workers, believe we are most fortunate in having so outstanding a group of experts attached to the committee in an advisory capacity. Few similar committees, we suspect, have had available for counsel a group of advisers who are devoting their lives to the problem at hand.

The tuberculosis committee again wishes to express its gratitude to the National Tuberculosis Association for their continued and unfailing cooperation. Our 1944-45 report announced the appointment of Mr. Arthur H. Stiefel, assistant in health education of the National Tuberculosis Association, to what has almost proved to be that of liaison officer between the American Student Health Association, American colleges and universities, and the NTA. His services are invaluable. He is responsible for the annual questionnaire from the time it is formulated until the final results are recorded and tabulated. Throughout the past year, Mr. Stiefel has been instrumental in having state and local tuberculosis associations make contact with those colleges not reporting tuberculosis programs. In addition to this, he has taken it upon himself to personally visit a group of programless eastern colleges.

Thus the American Student Health Association is in possession of the essential ingredients for a successful campaign to control tuberculosis on the campus of every college and university in the United States. When all of them have developed acceptable tuberculosis programs, educating hundreds of thousands of young Americans as to the true nature of tuberculosis, this treacherous disease will have received a severe blow. Similar attacks by industry, the military, secondary schools and even by whole communities could result in the realization of the dream of all tubercuolsis workers—eradication of the disease.

Respectfully submitted,

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Incidence of Tuberculosis in Student Nurses

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THE question of tuberculosis occurring in student nurses has been frequently discussed, for this is no mere matter of statistical tables nor the simple reporting of the incidence of a single disease in an isolated group. Nurses represent a group of individuals who have more than the ordinary amount of exposure to tuberculosis, and who can be checked regularly over a period of years. In addition, they are in that most susceptible of all ages, —the late teens and the early twenties. For these reasons, such a study is always significant from the standpoint of epidemiology and pathogenesis. Today in particular when the value or danger of primary tuberculosis, as indicated by the tuberculin test, is being argued so vigorously, the comparison of tuberculin negative and positive groups is of further interest.

This discussion relates to a series of student nurses who were very largely negative to tuberculin on admission to the school and who had undoubted contact with tuberculosis in the hospital and very likely outside of it. This is a collection of young women who satisfy all the requirements for a high incidence of disease and a high mortality, at least according to one school of thought. That, however, was not our experience.

There were 880 young women who were students in the Michael Reese Hospital training school for nurses between March 1940 and September 1946. With few exceptions the age on admission was 18-19. The overwhelming majority were from rural areas and small towns in the states nearest to Illinois. Tuberculin tests were done on admission. Originally, O.T. 1:1000 and 1:10 (0.01 mg. and 1 mg.) were used. In the past two years P.P.D. No. 1 and No. 2 have been substituted.

TUBERCULIN TESTS

Considering the origin of the greater part of the student body, it is not surprising to find that on admission only 118 or 13 per cent of the 880 nurses showed a positive tuberculin test. Seven hundred sixty-two or 87 per cent were negative to 1:10 tuberculin. All were under observation at least one year. Six hundred seventy were observed at least three years.

All negative cases were re-tested every six months at first and recently every three months. During the three years that they were in the hospital an additional 17 per cent showed a change to a positive tuberculin test. This gave a total of 27 per cent positive on graduation.

INCIDENCE OF TUBERCULOSIS

X-rays were taken on admission, once a year thereafter and on graduation. In addition, whenever a previously negative reactor showed a positive reaction, an X-ray was taken at that time. All cases with any abnormal shadows were X-rayed frequently.

The number of cases of reinfection tuberculosis of all types found in this entire group was three. One was a pleural effusion with a small sub-apical lesion which resolved. Another had minimal infra-clavicular infiltration which resolved. Neither of these two cases demonstrated tubercle bacilli on smear or culture of either sputum or gastric contents. The third showed a pleural effusion followed by an apical infiltrate. In this case one positive culture was obtained. There has been no mortality.

Two of the above cases have never been proved to be tuberculosis, but they were considered to be so because of their rather typical X-ray picture. It is impossible to rule out atypical pneumonia, but the absence of symptoms made this diagnosis unlikely. We felt that it was safer to consider and treat these cases as though the lesion was tuberculous and as such they are included in this series.

As a result we have an incidence of 0.34 per cent. If we consider only those under observation for three or more years, the incidence is 0.45 per cent. Two of these cases were tuberculin negative on admission, and one was tuberculin positive. In relation to the number in each category this is 0.23 per cent of negative reactors and 1.32 per cent of positive reactors. These percentages, however, cannot be considered of any significance and can thus have no importance in interpreting the results.

INTERPRETATION

In order to interpret these figures it is necessary to review briefly some of the figures for similar groups reported previously. These range from 2 per cent to 12 per cent (Table 1). As regards tuberculin negative reactors, the incidence of tuberculosis varies from 95 per cent (Heimbeck) to 2.3 per cent (Ornstein). This variation is not as great as it seems if reinfection tuberculosis only is considered since the incidence of primary tuberculosis in negative reactors is likely to be high, considering the exposure that may occur.

TABLE 1

	Percent Morbidity
Heimbeck	12.0
Britton and Bollman	2.2
Shipman and Davis	2.1
Shipman and Davis	6.0
Ross	6.0
Gordon and Cashman	2.0
Cohen	2.6
Ulmar	2.0
Ornstein	3.4
Average for U. S. (Rosenthal)	3.56

In the light of the average figure of 3.56 per cent our figure of 0.34 per cent – 0.45 per cent seems rather low. In comparison with Heimbeck's 95 per cent tuberculosis in negative reactors, our figure of 0.23 per cent for the same group seems almost non-existent. The latter discrepancy is explained by the fact that no differentiation between primary and secondary tuberculosis was made by Heimbeck. If the same procedure were followed in our series, the difference would still be 78 per cent since there were 17 per cent incidence of primary infection in our group.

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It is difficult to explain the low incidence either of primary infection or of reinfection tuberculosis. Patients with known tuberculosis are accepted for treatment in Michael Reese Hospital in addition to the many unrecognized cases of tuberculosis that survey figures show are admitted to all hospitals. During the period of this study, no survey by X-ray or fluoroscope was made of patients admitted to the hospital. The simple isolation precautions which are applied to all tuberculosis patients and to certain recognized respiratory infections as well has probably resulted in minimizing the amount of exposure.

Other factors which have been considered important in predisposition to tuberculosis may be considered briefly. The general health of the students is watched and reviewed carefully. The amount of work was, however, greater during this period of study than is customarily found. With additional work, study, recreation and social activities, this student body had rather full days.

Discussion

There are a number of points which must be discussed after presenting this bare statement of figures—points on which these figures have some bearing. There is the problem of the negative reactor. Is such a person in danger on entering an environment in which contact with the tubercle bacillus may occur?

There has been a common opinion that the absence of a primary infection spells danger in the adolescent years or young adult life to the person who comes to live in a large city or who is thrown into contact with possible tuberculosis carriers. Mayer and Rappaport said "Contact is always dangerous to tuberculin negative adults because these are presumably coming from a non-tuberculized environment . . . It has long been established that boys and girls who come from less tuberculized rural sections and become over exposed to a highly tuberculized city often develop disease . . . Young people attending tuberculous patients must be very closely watched. Tuberculin negative persons are especially in danger . . . "

In another publication the same authors stated that lack of contact explains the fact that "Many of our young adults now develop progressive lesions from their contact infections."

Holm in discussing tuberculosis of medical students in Copenhagen stated that of 863 negative reactors, 52 developed X-ray evidence of tuberculosis, and 21 had positive sputum. He stated that "Instances of tuberculosis occurrence are far more frequent among the tuberculin negative students than among the tuberculin positive." He stated further "The danger of exposure to tubercle bacilli is considerably greater for tuberculin negative than for tuberculin positives . . . "

In a study of 1,278 adults and 1,020 children who showed a negative tuberculin test on admission to the Central Tuberculosis Dispensary in Copenhagen with an average period of observation of 2.3 years for the adults, we have the following figures for the adult females. Of the 583 women studied, 100 (17.2 per cent) showed subsequent X-ray changes interpreted as tuberculosis. Thirty-three (5.7 per cent) showed genuine or clinical tuberculosis. Four patients (0.675 per cent) died of tuberculosis. He stated that the propagation of the tuberculous process took place nearly always in the first two years after infection.

In the publication, *Management of Tuberculosis in the General Hospitals* published by the American Hospital Association we find, "The tuberculin positive reactor is less likely to develop serious tuberculosis than the negative reactor." There have been many other such reports making similar statements, and there is no necessity for quoting in greater detail.

On the basis of these statements we should expect that a group of young women so largely tuberculin negative (87 per cent) would present a high incidence of tuberculosis; however, as stated above the actual figure in our series is 0.45 per cent. The figures of Holm particularly show a striking contrast. His 583 adult females, followed for an average period of observation of 2.3 years, show 100 with X-ray changes, 53 with clinical tuberculosis, and 4 deaths compared with a period of 3 years observation of 670 students which shows 3 X-ray shadows, 1 case of clinically proven tuberculosis, and no deaths. There is no possible explanation of this difference except to say that in Holm's and other quoted series there must have been unrecognized factors responsible for the high percentage of disease that were entirely independent of the negative tuberculin state of the group in question. It is perfectly obvious that if the assumptions were correct as quoted above that such young people "often develop disease" on entering a "highly tuberculized city," which Chicago certainly is, we should have expected an incidence of disease approaching that reported by Holm.

The very low incidence actually found should be sufficient evidence that the danger of acquiring tuberculosis is not in any way increased by the absence of a previous primary infection.

A further statement often used in discussing the negative reactor is that when such individuals acquire a tuberculous infection of any sort there is a tendency to a progressive disease as stated by Mayer and Rappaport, "Many of our young adults now develop progressive disease from their contact infection."

Rosenthal says, "There can be no question that the so-called primary infection in young adults may be progressive, and in a high percentage of cases, hospitalization and loss of time and monetary compensation is the rule."

This concept is based upon the fact that the primary infection must of necessity be massive, the allergy very high; and it is a natural assumption, therefore, that the progressive type of disease will ensue instead of the customary benign primary lesion. In our series, X-ray pictures were taken as soon as a positive tuberculin test was demonstrated. With very few exceptions the primary lesion thus demonstrated was so small in extent that it did not present the typical picture of pulmonary consolidation with massive lymph nodes. In general the X-ray showed small, patchy infiltrate with little enlargement of the mediastinal nodes. None of these nurses were taken off duty nor were their activities interfered with in any way. The cases that showed more extensive pulmonary involvement, fever, or symptoms were put to bed during the period of temperature elevation only and then returned to work. There were no cases that could be classified as lesions progressing from the primary lesion in the entire group. The type of disease in the 3 reinfection cases and the possible contact will be discussed later.

It would seem once again that in these series where progressive disease was reported, the assumption that a previous negative reaction was responsible for this progression is not entirely logical. We must assume on the basis of our experience that some other set of factors were operating in these series and that the previous negative tuberculin reaction played little, if any, part.

In two of the three cases which showed re-infection tuberculosis we were able to establish a definite contact. The third, in which we could never actually establish the diagnosis of tuberculosis, was also a case in which no definite contact could be found.

The first case was in contact with another hospital worker who was subsequently found to have an open cavity and a highly positive sputum. This contact extended over a period of several weeks. The nurse developed a small pleural effusion which resorbed, and six months later a small exudative infiltrate was found in the left subapical region. Hospitalization was recommended, and careful sputum and gastric studies were done which failed to demonstrate tubercle bacilli by concentration technics or by culture. The entire lesion resolved, and a year later her X-ray was read as indicating a normal chest. She has remained well to date which is four years after her original infection. She was classified as a resolving exudative tuberculosis of minimal extent. The second case developed a positive tuberculin test six months after entering training school. Three months later she was exposed to a patient who was subsequently found to have an advanced tuberculosis. Three months following this she developed a pleural effusion with no other clinical picture of tuberculosis. This cleared up with moderate period of treatment, and one year later a left apical lesion appeared. After many studies which were negative, tubercle bacilli were found in the gastric contents. A small cavity was later visible in the X-ray, and pneumothorax was done. This patient has continued her pneumothorax and has returned to full nursing duty. She has had no complications or other evidence of presence of disease.

HOW SHOULD STUDENT NURSES BE PROTECTED?

If we are to judge by our experience, certain definite statements can be made in regard to protection of student nurses from tuberculosis.

It is not necessary to refuse admission to tuberculous patients. As has been mentioned above, patients with known tuberculosis are admitted and treated at Michael Reese Hospital, and this does not seem to have caused any serious infection in the nursing personnel. Under any circumstance, the survey method of X-raying admissions indicates that all the hospitals must have admitted cases of tuberculosis unwittingly in the past whether they accepted such a case officially or not.

Despite resurgence of popularity and its many enthusiastic supporters there would seem to be no evidence that vaccination by B.C.G. will in any way improve the condition. The fact that no evidence has been presented to indicate on a scientific basis that there is a protective action in the use of this vaccine is not a matter that can be gone into here in any detail. The important subject is the basis for this vaccination: the thesis that the state of negative reaction is dangerous and that this must be corrected by B.C.G. Since, as we have shown above, our experience has not corroborated this opinion and since the percentage of tuberculosis in our series of non-vaccinated nurses is less than that reported in any series of vaccinated individuals, there would not seem to be any justification for this procedure. We therefore feel that even if an immunization mechanism were produced by this vaccine it would be unnecessary and, as just stated, evidence of such mechanism is in itself lacking.

The most important factor appears to be good nursing technic and well-organized isolation procedures. This varies in different institutions, and many people have strong opinions as to what is necessary. In our opinion, the wearing of the mask by nurse and patient, wearing of a gown, and simple isolation technic practiced by the nurse seems to be adequate to prevent contagion.

A study is now in progress in an attempt to eliminate tuberculosis entirely from the student nurse group. This entails X-ray of all patients and all employees and a study of the service of the three months preceding the appearance of the positive tuberculin test. We hope by these means to obliterate all but the accidental infection that occurs from simply living in a big city. This latter type of infection is unlikely to produce any serious disease. It would be interesting to observe whether these additional precautions and safeguards cause any further diminution of our already low rate of tuberculosis.

SUMMARY

1. A study was made of 880 young women, students of the Michael Reese Training School for Nurses between 1940 and 1946. The average age on entrance was 18, and the overwhelming majority were from rural areas and small towns.

2. A negative reaction to 1:10 tuberculin was found in 762 individuals representing 87 per cent of the total. 118 or 13 per cent showed a positive reaction.

3. The incidence of primary infection during the three years of study was 15 per cent, giving a total of 28 per cent positive tuberculin reactions on graduation.

4. There were three cases of reinfection tuberculosis. This is an incidence of 0.45 per cent of the 670 cases followed for 3 years or more, or 0.34 per cent of the entire group of 880.

5. Tubercle bacilli were demonstrated in only one of these cases. There was no mortality.

CONCLUSIONS

1. The incidence of tuberculosis in young people is not increased by a previously negative tuberculin reaction.

2. Negative reactors are not more likely to develop progressive tuberculosis following the primary infection.

3. Protection of nurses is no justification for the re-

fusal to admit cases of tuberculosis to a general hospital since adequate isolation technic will prevent infection.

4. Vaccination with B.C.G. is not necessary or indicated for student nurses.

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CHILEAN TRUDEAU HOSPITAL MAKING RAPID PROGRESS

Chile's war against tuberculosis, the chief cause of death in the nation, will gain new impetus this year with the completion of the new 500-bed Trudeau hospital in Santiago, in the opinion of Dr. Theodore I. Gandy, chief of The Institute of Inter-American Affairs medical mission in the Chilean capital.

Dr. Gandy pointed out that the death rate for tuberculosis in the province of Santiago averaged 327.6 per hundred thousand persons from 1934 through 1943.

"Chile has been making outstanding progress in fighting tuberculosis during the past two decades," Dr. Gandy stated during a recent visit here. "Free diagnostic services, furnished by the government, are locating active cases, and treatment is being offered free to open cases. However, the shortage of hospital facilities and beds to meet the tremendous need has been a severe bottleneck hampering the government's efforts."

The Trudeau hospital is being built as a project of the joint Chilean-United States Inter-American Cooperative Department of Public Health Works. The organization has also given technical assistance in the design and construction of an addition to a tuberculosis sanitorium at San Jose de Maipo, and has planned and is helping to build a 120-bed addition to the Franklin D. Roosevelt tuberculosis sanitorium at Gauyacan. It also has provided equipment for the recently completed Carabineros Hospital in Santiago.

Dr. Gandy pointed out that the United States is gaining immediate, as well as long-term benefits, as a result of this partnership in developing better health in a good neighbor nation.

"Chile, like many other Latin American countries, used to look largely to Europe for hospital and surgical equipment and pharmaceuticals," he said. "Now she is turning to the United States as she is establishing a growing demand for these things."

This hospital building program is only a nucleus for future developments. For instance, in the case of the Trudeau hospital, the plans leave places for many new pavilions to be constructed by the Chilean government.

The joint Chilean-United States public health organization also has built three model health centers, at Antofagasta, Santiago, and Valparaiso, and a fourth is under construction at Temuco. The centers seek to demonstrate what can be accomplished by environmental sanitation and preventive medicine.—*Inter-American Affairs,* Washington, D. C.

Tuberculosis in Mexican Agricultural Laborers*

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EVERY Spring several thousand Mexican agricultural workers migrate from Texas to work in the sugar beet fields of Michigan. It had been noted that a considerable number of Mexicans were being admitted to the tuberculosis hospitals. For instance, in 1937, the roster of the Saginaw County Hospital showed that 25 per cent of the patients were Mexicans whereas the permanent Mexican population of that county was only 2 per cent. Investigation showed that the majority of the Mexican patients had come to Michigan with their families to work as agricultural laborers. Because of this abnormal situation, several meetings were held in the Fall of 1937 at which the possible ways and means of combating the problem were discussed by representatives of the Saginaw County Departmnt of Health, the Michigan State Department of Health, the State Department of Labor and Industry, and the Sugar Beet Growers' Association. These discussions were continued at intervals during 1938 and a committee was formed to make further studies and recommendations. In the Fall of 1938 the committee reached an agreement with the Beet Growers' Association on a plan which called for an examination of sugar beet laborers before they began their trip from Texas to Michigan. The Michigan State Department of Health was to make the examinations at the concentration headquarters or employment center in San Antonio, Texas. The cost of the examinations was to be borne jointly by the State Department of Health and the employers of sugar beet laborers. This plan was presented to the Texas State Health Department and approval was obtained for the Michigan physicians to carry out the project.

Because a majority of the candidates and their families were recruited from distant points, it was necessary to limit their stay in San Antonio to as short a time as possible because of the expense involved. Economy in conducting the examinations was also essential to keep within the limited budget. It was decided, therefore, to use a fluoroscope for the examination of the chest for pulmonary tuberculosis. We realized, of course, from our own experience and that of others, that an error of about 15 per cent could be expected in using fluoroscopy.[1]

The examination center was set up in a large room adjacent to the employment office. This room was partitioned to provide for a dark room for the use of the fluoroscope, with a dressing room on either side. Groups of males and females were admitted alternately for examinations. After the name and age were typed on an identification card, each person was assigned a number and sent to a photographic machine which took a passport-like picture of the head and shoulders as well as the identification number assigned to the individual. They were then sent to one of the dressing rooms where they removed their clothing to the waist. They then passed into the fluoroscopy room where a careful examination of the chest was made. After completion of the fluoroscopic examination, they proceeded to the next dressing room for inspection of the skin and mucous membranes for secondary syphilis. All men were given a genital examination for the presence of venereal disease.

If a candidate passed the examination, his photograph was clipped to his identification card and presented to him. The card was then taken to the employment office and subsequently carried by the individual to Michigan. If pulmonary tuberculosis or other major chest pathology was found, or if venereal disease was discovered, the applicant was rejected and the identification card was not given to him. Thus only applicants who had passed the examination and presented their identification cards were accepted for employment. The results of the examination were recorded on the back of the identification card.

TABLE 1
Number of Cases of Tuberculosis Diagnosed by Fluoroscopy in 1939

Stage of Disease	Number Examined	Number Cases	Percent of Total	Percent of Cases
Minimal	.....	33	0.77	50.75
Moderately advanced	.....	33	0.77	40.75
Far advanced	.....	15	0.35	18.50
Total	4271	81	1.89	100.00

Table 1 shows that in 1939 there were 4,271 individuals examined, 81 of whom were found to have fluoroscopic evidence of pulmonary tuberculosis. It will be noted that 40.7 per cent of the cases found had minimal lesions, 40.7 per cent were moderately advanced, and 18.5 per cent were far advanced. The incidence in the number examined was 1.89 per cent.

In addition to those rejected for tuberculosis, there were nine persons rejected for aortic aneurism, six for aortic enlargement, four for urethral discharge and one for pimary syphilis.

The experience gained from this first program in 1939 aided considerably in the development of the 1940 examination program. The same system was used except that in addition, we obtained X-ray films of most of those individuals who presented positive pathology under the fluoroscope. This was done in order to obtain a permanent record of pathology found and a check on the accuracy of fluoroscopic findings.

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*Read before the Epidemiology Section of the American Public Health Association at the sixty-ninth annual meeting in Detroit, Michigan, October 9, 1940.

EDITOR'S NOTE: This paper was submitted by special request. It is of considerable historic value because it represents the first attempt, to our knowledge, of examining for contagious tuberculosis large numbers of persons who transfer from place to place in one country or from nation to nation. It is hoped that this will lead to adequate examination for this disease of all persons entering this country for any purpose, as well as such examinations for all of our citizens who seek passports to other countries. The great value of such a procedure is shown by the results reported in this paper.

Table 2
Number of Cases of Tuberculosis Diagnosed by Fluoroscopy in 1940

Stage of Disease	Number Examined	Number Cases	Percent of Total	Percent of Cases
Minimal	....	67	1.16	55.4
Moderately advanced	....	43	0.75	35.5
Far advanced		11	0.19	9.1
Total	5753	121	2.10	100.00

In 1940 as shown in Table 2, a total of 5,753 individuals were examined by fluoroscopy, 121 of whom were diagnosed as having signs of pulmonary tuberculosis. Incidentally, these examinations were made in seventeen working days, between April 13 and May 3. Thus, an average of 340 fluoroscopic examinations were made per day, in addition to X-ray films of the positive and suspected cases, inspection of the skin and mucous membranes, and genital examinations of male candidates. It will be noted in Table 2 that 2.1 per cent of all candidates examined were diagnosed as having pulmonary tuberculosis, a slightly higher incidence than was found in 1939. Unfortunately, a few of the films made on the first two or three days were spoiled or unreadable. Also, a larger number of persons did not wait to have a film made. As a result we have films for only 98 persons showing positive findings for tuberculosis.

Table 3
X-Ray Films Showing Positive Evidence of Tuberculosis

Stage of Disease	Number Cases	Percent of Cases
Minimal	41	41.8
Moderately advanced	41	41.8
Far advanced	16	16.4
Total	98	100.00

The classification of these 98 persons is shown in Table 3. The percentage of cases in each class is considerably different from those diagnosed by fluoroscopy. We believe this can be accounted for mainly by the fact that a film reveals a greater amount of infiltration than can be seen by fluoroscopy. There were 51 cases diagnosed as minimal by fluoroscopy. When those were compared with the film reports it was found that there was agreement in 26, in 20 the film classification was moderately advanced and five were negative for tuberculosis. Of 31 diagnosed by fluoroscopy as moderately advanced, 20 were in agreement with the films, eight were classified as far advanced, two as minimal and one as negative. Of nine diagnosed by fluoroscopy as far advanced, eight were in agreement with the films and one was classified as moderately advanced.

Referring again to the classification of cases as derived from the X-ray films, it will be noted that 41.8 per cent had minimal lesions. This is an indication of the results that may be expected in examining groups of presumably well persons. In other words, if we look for tuberculosis in such persons we can expect to find cases which are readily amenable to simple collapse therapy and which have a much more favorable prognosis. For instance, in Michigan the classification of patients first entering hospitals in 1939 was minimal 21.2 per cent, moderately advanced 32.2 per cent and far advanced 46.6 per cent.

Table 4
Abnormalities Other Than Tuberculosis

	1939		1940	
	Number	Percent	Number	Percent
Primary syphilis	1	0.023	0	0
Urethral discharge	4	0.093	4	0.07
Aneurism	9	0.21	6	0.10
Aortic enlargement	6	0.14	15	0.26
Cardiac enlargement		.....	10	0.18
Total	20		35	

As is shown in Table 4, 0.47 per cent of all persons examined were rejected in 1939 and 0.69 per cent in 1940 for causes other than tuberculosis. Although the skin and mucous membranes were examined for evidence of secondary syphilis, no such lesions were found. However, aneurism and lesser enlargement of the aorta as well as cardiac enlargement accounted for the majority of the abnormalities.

In spite of the obvious fact that the methods of detecting tuberculosis used in this program were not the most efficient, we believe we have demonstrated that worthwhile results were obtained. Approximately 200 cases of tuberculosis were prevented from coming to Michigan in these two years. Although sputum tests were not made it may be assumed that the majority of those persons classified as moderately and far advanced were in a communicable state. The public health significance of preventing exposure to Michigan people to these sources of infection is readily apparent. Michigan tuberculosis hospitals have adequate bed capacity and it is our policy to hospitalize our patients immediately after diagnosis. This is desirable, of course, to give the patient prompt and adequate treatment and to remove sources of infection from the population. As it costs more than $1,000 per year for this care for each patient, the economic savings effected by the program are important. Even if only 50 Mexican patients had needed hospitalization the cost would exceed $50,000 per year. Therefore, the small investment needed to finance the program was amply justified.

It was necessary of course to have the cordial co-operation of the employers of this labor in order to make the program possible. First, it was necessary to have an organization of the employers with which to negotiate, and secondly, it was necessary to call their attention to the benefits to be derived. They were quick to see the advantages of healthier workers and were equally impressed with the opportunity to be the first industry, employing such labor, that recognized a definite responsibility to the taxpayers and the general public of the state.

SUMMARY

A program for the examination of Mexican agricultural laborers employed in the sugar beet fields of Michigan has been conducted by the Michigan Department of Health at the employment center in San Antonio, Texas.

In 1939, 4,271 persons were examined, among whom were found 81 cases of tuberculosis and 20 others who had abnormalities other than tuberculosis.

In 1940, 5,753 persons were examined among whom were 121 persons diagnosed as having pulmonary tuberculosis and 35 others who had non-tuberculosis abnormalities.

The rejection of these persons for employment prevented an influx of a considerable number of infectious tuberculosis cases into Michigan.

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ANNUAL MEETING, AMERICAN COLLEGE OF CHEST PHYSICIANS

The Thirteenth Annual Meeting of the American College of Chest Physicians is scheduled to be held at the Ambassador Hotel, Atlantic City, New Jersey, June 5 to 8. An interesting scientific program has been planned for this meeting. Prominent speakers from other countries will present papers.

The oral and written examinations for Fellowship will be held on the first day of the meeting, June 5. Applicants for Fellowship in the College who plan to take these examinations should communicate *at once* with the Executive Secretary, American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

The Convocation for new Fellows and Life Members of the College will be held on Sunday, June 8. At this time certificates will be awarded to Fellows and Life Members admitted since June 1946.

BRITISH COMMONWEALTH AND EMPIRE HEALTH AND TUBERCULOSIS CONFERENCE, 1947

A Conference on Tuberculosis, arranged by the National Association for the Prevention of Tuberculosis of Great Britain, will be held in London from July 8th to 10th, inclusive. There will be special reference to the problem as affecting the British Commonwealth, and representatives from all the Dominions and Colonies have been invited, but the Conference will deal with Tuberculosis in all its aspects, and it is hoped to welcome many visitors from other countries.

The Rt. Hon. Aneurin Bevan M.P., Minister of Health, has promised to attend on the first day of the meeting, and to speak on the subject of Tuberculosis and the National Health Service Act.

The sessions will include discussions on Tubercuolsis in the British Commonwealth and the Colonial Tuberculosis Services; Sanatorium design; alter-care and rehabilitation; the psychology of Tuberculosis; new discoveries in the prevention and treatment of the disease, and the National Health Service and its effect on Tuberculosis Schemes.

Plans are being made for overseas guests to see something of the anti-Tuberculosis work for which Great Britain is famous, and will include visits to sanatoria, hospitals and clinics, and demonstrations of various kinds. The Conference is open to both doctors and laymen, from this country and from overseas, and fuller particulars can be obtained from the Secretary-General, National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock Square, London, W.C.1.

The Therapy of Hemorrhage

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Severe hemorrhage always presents a medical crisis which must be dealt with promptly and adequately if death is to be prevented. In recent years our knowledge of the pathological physiology of hemorrhage has been advanced and the therapy of hemorrhage has been perfected. The need for treatment of hemorrhage in war casualties served as a stimulus for these studies, as never before have blood and blood derivatives been used on such a large scale.

In civilian practice the problem of massive hemorrhage is a common one. War experience has taught us that extensive traumatic injuries are almost always accompanied by marked hemorrhage, and it is now believed that the shock associated with traumatic injuries is due most frequently to hemorrhage. The bleeding may occur externally, into the tissue, as in a fracture, or into the peritoneal and pleural cavities. Hemorrhage also presents a formidable problem when it occurs apart from trauma. Usually the fact that severe bleeding has occurred is obvious to the physician, particularly if the bleeding is external. If bleeding occurs into the gastro-intestinal tract or into the peritoneal cavity the diagnosis may present some difficulty. Hemorrhage from a gastric or duodenal ulcer is usually accompanied by hemetamesis and melena. If the patient is first seen in shock this history may not be obtained, but the diagnosis can be readily made by digital examination of the rectum. A small specimen of stool obtained in this manner will be tarry in character and will give a strongly positive reaction for occult blood. Ruptured ectopic pregnancy may similarly present the picture of shock as a result of bleeding into the abdominal cavity.

Hemorrhage results in certain changes in the physiology of the patient which are of importance with regard to treatment. Mild or moderate hemorrhage may produce few symptoms in the prone position.[1] Moreover, the cardiac output may be sustained at a normal level. On the other hand, removal of a very small amount of blood, or even the sight of blood, may lead to syncope. This reaction is seen most often in blood donors, and cannot be correlated with the amount of blood removed. The subject becomes pale, perspires, feels weak and often nauseated. The pulse becomes feeble and the arterial pressure falls. A characteristic finding is slowing of the pulse, the pulse rate frequently being as low as 40. The reaction usually subsides over a relatively brief period of time. Physiological studies [1,2] have shown that this reaction is the result of arterial vasodilatation, presumably neurogenic in origin. The cardiac output and hence the blood flow to the tissues remains relatively normal. It is possible that the syncopal reaction may be a protective mechanism, the fall in arterial pressure lessening bleeding and permitting clotting to occur.

This benign reaction is to be differentiated from the shock which accompanies severe hemorrhage and which results from marked oligemia. Shock is manifested by weakness, pallor, cold extremities, a feeble pulse, low arterial pressure and a normal or rapid pulse rate. The latter finding will usually differentiate it from the syncopal reaction. The degree of oligemia associated with shock due to hemorrhage has been well established as a result of recent studies. In severe shock the blood volume deficit is approximately 40 per cent of the total blood volume.[3,4,5] The normal blood volume for the average sized male is approximately 5000 cc., hence, the deficit would be 2000 cc. Associated with the oligemia is a marked fall in cardiac output, resulting in a diminution of blood flow to the essential organs and tissue anoxia.[4] Renal blood flow is markedly reduced,[6] and if renal ischemia is prolonged, permanent anuria may occur.[7] Anoxia of the liver is particularly serious as this organ is so vital to many metabolic functions. Studies have shown that in serious shock the liver fails to regenerate plasma protein at a normal rate [8] and that it is less effective in deamination of amino acids.[9]

The best criteria of the severity of shock appears to be the arterial pressure.[3] If this falls below 80 mm. of mercury systolic, the degree of oligemia is usually severe. The pulse rate is a much less reliable index as it may be normal in severe grades of shock, and is also readily affected by other factors such as pain.

The physiological mechanisms for the replacement of blood volume appear to be relatively ineffective in severe shock. Following hemorrhage there is hemodilution as a result of a shift of extracellular fluid into the vascular system, resulting in a lowering of the hemoglobin and plasma protein concentrations. This hemodilution is variable and is not sufficient to replace the blood volume deficit in severe hemorrhage. In a study of hemorrhage in battle casualties, the average amount of hemodilution with protein free fluid was 200 cc. and the maximum was 500 cc.[3] If the blood volume is to be markedly increased by physiological means, protein must be added to the circulating plasma. There appears to be no large preformed reservoir of plasma proteins which can be added to the circulating blood in an emergency, but rather there is a constant increment of protein added during the hours succeeding hemorrhage. In humans subjected to moderate hemorrhage an average of 5 grams of protein were added to the circulating plasma during the first two hours.[10] There is evidence that the replacement of plasma proteins may not occur in severe shock presumably because of liver anoxia.[8] In dogs the spleen serves as a reservoir of red cells and these cells may be added to the general circulation in emergencies such as hemorrhage. In humans the spleen appears to have largely lost this function.[11] In summary, the physiological mechanisms for replacement of the blood volume in severe shock following hemorrhage appear to be unreliable and relatively ineffective, so that if death is to be avoided the oligemia must be corrected by the physician.

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The treatment of shock must be prompt and adequate. Death may occur at any moment, and if shock is allowed to persist for long periods response to therapy may be poor. Therapy consists of restoration of the blood volume to normal and hemostasis. The latter may be simple if bleeding is external, but if control of the bleeding requires major surgery it is wise to replace the blood volume before the patient is subjected to anesthesia and operation. In the case of bleeding from a gastric or a duodenal ulcer surgical control of the bleeding is usually not indicated unless repeated hemorrhage occurs.

In the replacement of the blood volume following severe hemorrhage three types of fluids have been used: saline or glucose solutions, plasma, and whole blood. The use of saline or glucose solutions has been largely abandoned in the treatment of shock due to hemorrhage. Because of the lack of protein these fluids diffuse readily from the vascular system into the tissues, and the increase in plasma volume which they produce is variable and often transient. It has been shown that if the use of saline in the treatment of shock due to loss of blood or plasma is to be effective, huge amounts must be given so that the extracellular fluid is greatly increased. In dogs it was found that amounts equivalent to 50 per cent or more of the animal's body weight were necessary.[12] Obviously the use of this quantity of saline in humans would be impractical and undesirable. The use of saline solution would be indicated if there was associated loss of electrolytes due to vomiting, diarrhea or diabetic acidosis.

The mainstay in the treatment of shock due to hemorrhage is the use of plasma and whole blood. Plasma is extremely effective in the replacement of the blood volume following hemorrhage, as is serum albumin, a derivative of human plasma. These substances are ideal for the treatment of shock resulting from plasma loss, as in burns. In shock due to hemorrhage the use of plasma leads to anemia as a result of the dilution of the remaining red cells. This anemia may be severe if large amounts of plasma are used. Anemia renders the patient less resistant to a subsequent hemorrhage and a poor risk for surgery, hence, whole blood is preferred as a replacement fluid in hemorrhage. The recently noted high incidence of homologous serum jaundice following the use of pooled plasma has also lessened the enthusiasm for the use of this type of therapy.

The perfect fluid for replacement of blood volume following hemorrhage is whole blood. The use of large amounts of whole blood in emergencies has been greatly facilitated by the widespread establishment of blood banks. An important advance in the storage of blood was made during the war by the demonstration that the addition of glucose solution to blood greatly lengthens the period it may be stored. Blood drawn into sodium citrate solution should not be used after one week of storage as the cells will survive only a short time in the circulation of the recipient. If glucose is added to the citrated blood so that the final concentration is 0.6 per cent, the blood may be stored two or three weeks. One of the difficulties in using a glucose citrate mixture for a diluent is that the glucose will carmelize if the mixture is autoclaved. Recently an acid citrate glucose mixture composed of sodium citrate, citric acid and glucose has been advocated.[13] This can be autoclaved as a mixture and gives excellent cell survival time after periods of storage as long as four weeks. The provision of commercial transfusion equipment suitable for the storage of blood has rendered the establishment of a blood bank in the smallest hospital a matter of extreme simplicity.

Ideally transfused blood should be of the same blood type as the donor. Rh negative recipients should receive only Rh negative blood. Unfortunately, in an emergency it may not be possible to fulfill all of these requirements. Group O blood was used very extensively for recipients of all blood groups during the war. Hardin [14] has reported on the results and states that the incidence of reactions was not significantly greater than in the use of type specific blood. It is known that Group O blood will occasionally lead to mild hemolytic reactions if given to recipients of other groups. If large quantities are used a more serious hemolysis of red cells may occur.[15] From the available information it appears that the use of group O blood in emergencies for patients of all blood groups is permissible. The very slight risk entailed is much less than the risk involved by the delay necessary for typing and cross matching of blood. This risk can be minimized if group O blood containing a low titre of Anti A and Anti B isoagglutinins is used. Where the element of time is unimportant, type specific blood is preferable.

The question of Rh incompatibility is an important one. Reactions due to Rh incompatibility do not occur in men who have not had previous transfusions, or women who have not been pregnant or had previous transfusions.[16] It is safe to give transfusions without Rh grouping of the recipient under these circumstances although the recipient may develop anti Rh agglutinins which could cause a reaction with subsequent transfusions. However, if the recipient has had previous transfusions, or especially if the patient is a woman who is pregnant or has had previous pregnancies, it is wise to use plasma as therapy until Rh grouping of the recipient can be completed.

In the therapy of shock due to hemorrhage speed and the use of adequate quantities of blood are essential. If the veins of the arm are constricted and venipuncture is impossible, blood can be transfused into the femoral vein just below the inguinal ligament. The size and anatomical relations of this vein prevent it from collapsing even in the most severe shock. If the blood volume is to be returned to normal in severe shock, approximately 2000 cc. of blood must be used. If additional bleeding occurs during therapy, it is necessary to increase this amount. If the transfusion is running slowly, adequate speed can be attained by attaching a sphygmomanometer bulb to the air inlet and applying pressure. Caution must be exercised when the bottle empties to prevent air from entering the veins.

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NATIONAL CHEST CENTER IN THE PHILIPPINES

A National Chest Center, first of several new tuberculosis clinics to be constructed in Manila, P. I., before the end of 1947, was opened last fall, according to Dr. Leroy K. Young, USPHS consultant on tuberculosis to the Philippines. The Center, Dr. Young said, is the first unit to be built under the supervision of the USPHS in the Philippine Public Health Rehabilitation Program, a cooperative activity between the U. S. Government and the Government of the Philippines.

Built from Navy Quonset huts, the Center comprises an administrative unit, a laboratory, a treatment clinic and a training center for the physicians, nurses and technicians who will work under the program.

Dr. Young, who visited the office of the National Tuberculosis Association recently, before returning to Manila, said that during the next five years similar clinics will be constructed and the control program will be expanded to cover the entire Archipelago.

In the beginning, he said, the main concentration of effort will be in Manila, where the tuberculosis death rate has been reported to be in the vicinity of 480 per 100,000.

"Sanatorium care for an appreciable percentage of the large number of people with active tuberculosis will be impossible for some time," Dr. Young stated. "We have fewer than 1,000 hospital beds for tuberculosis throughout the Islands, and Manila itself needs at least 5,000. There is a severe shortage of personnel, equipment and funds. All of these conditions have been exacerbated by the war, which destroyed hospitals and medical equipment, disrupted sanitary services and, in general, lowered the living conditions and the health of the people.

"One of our main tasks will be the training of physicians, nurses and technicians in tuberculosis work. We are planning a case-finding program for Manila with the objective of discovering as many infectious cases of tuberculosis as possible. Hospital, clinic and home care will be provided to the maximum extent possible and every effort will be constantly made to increase the scope of treatment services possible.

"A case register will be established to include all infectious cases and their home contacts, to serve as the center of our activities in providing care for these persons and to check on the effectiveness of our program.

"With the above activities as a nucleus, all the other elements of a complete tuberculosis program, such as sanatorium care, welfare aid, rehabilitation, etc., will be added as increased funds become available."—*NTA Bulletin*, February, 1947.

Vitamin D_2 in the Treatment of Cutaneous Tuberculosis

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LUPUS VULGARIS and other types of cutaneous tuberculosis have apparently been successfully treated with large doses of vitamin D_2 (calciferol). Independent investigations by Charpy [1] in France, Dowling and Prosser Thomas [2] in England, and Fanielle in Belgium have shown excellent results with this method of treatment. This is a report of the cases so treated at the University of Minnesota Hospitals and in private practice by local dermatologists.

LUPUS VULGARIS

According to the classification of Michelson and Laymon,[4] lupus vulgaris is the one form of cutaneous tuberculosis which is chronic and progressive without necessarily being associated with serious systemic tuberculosis. Its importance lies in its relation to the other forms of cutaneous tuberculosis, most of which tend to heal spontaneously. Self healing is especially typical of (1) the cutaneous primary complex (tuberculous chancre), (2) the tuberculosis cutis verrucosus, (3) the necrotic papular, and (4) lichenoid tuberculids, but is also seen in the more slowly healing, (5) erythema induratum, and (6) scrofuloderma.

However, untreated lupus vulgaris is almost a perfect balance between the organism and resistance of the host, and because of this extreme chronicity spontaneous healing is rare and it will remain active for decades. The patient can thus act as his own control in new therapeutic trials. Pathologically, lupus vulgaris consists of typical non-caseating tubercles in the corium. Not infrequently tubercle bacilli are demonstrable in the sections, and guinea pig inoculations commonly produce tuberculosis.

Historical Background. In 1848 Emery [5] treated 74 patients with lupus vulgaris by daily administering as much as a liter of cod liver oil, now known to contain approximately 85 international units of vitamin D per gram. Improvement was noted but the unpalatability of such large amounts of cod liver oil made the method impracticable.

Basing his experiments on the observation by Henri and Baroni [6] in 1910 that the tubercle bacillus loses acid-fastness after a few minutes radiation with a quartz lamp, Malmström,[7] in 1925, irradiated cod liver oil. He injected extracts into tuberculous lesions, and reported prompt healing. Villaret, Justin-Besancon and Fauvert,[8] in 1926, used irradiated cholesterol up to 500 cc. intrapleurally in purulent tuberculous empyema. They considered their results to be promising but not as spectacular as those of Malmström. They suggested the oral use of irradiated oils as a valuable aid with which to build up the patient's general health.

Working with white rats which are ordinarily immune to tuberculosis, Grant, Suyenaga and Stegeman [9] decreased the calcium and vitamin D in the diet, rendering the rats susceptible to acid-fast infection. On the other hand, rats which received adequate diets before and after inoculation with the tubercle bacillus were immune to four to ten times the usual doses. In 1935 Steiner, Greene and Kramer [10] reported that rachitic rabbits showed no greater incidence or any more extensive tuberculosis following inoculation of virulent acid-fast bacilli than did control rabbits.

In 1930 Levaditi and Po [11] in France and Spies [12] in America independently reported increased calcification of tubercles in guinea pigs treated with irradiated ergosterol. Levaditi and Po [13] demonstrated that the dead as well as the living tubercle bacilli provoked this response and postulated that the calcium deposition was the result of intracellular calcium metabolic changes and not phagocytosis of loose calcium. The tuberculous processes seemed to have a more special affinity for the calcium than normal tissue.

Trevorrow, de Savitsch, Black and Lewis,[14] reporting on experimental tuberculosis of rabbits and guinea pigs, stated that 92 to 94 per cent of the groups treated with viosterol alone, with viosterol and tuberculin combined, and with prolonged sunlight irradiation without tuberculin showed calcification of the lesions, whereas 25 per cent of the tuberculin controls and 14 per cent of the untreated controls showed similar calcification. However, the viosterol-treated rabbits expired earlier, presumably due to toxicity from the vitamin D. Reed, Stuck and Streck [15] quote Capocaccia (1934) as finding no beneficial effect in guinea pig and rabbit tuberculosis with sub-toxic doses of vitamin D.

In 1928, Bamberger and Spranger [16] found improvement in 40 infected guinea pigs, and then applied the drug to children with various forms of tuberculosis. Improvement in the local processes was constantly noted, but toxic symptoms prevented prolonged use. Sub-toxic doses showed no change in the tuberculous processes. Later, their drug (the old Vigantol of the I. G. Farben Co.) was found to have a high toxisterol content, necessitating further purification.

Crimm,[17] in 1932, produced hypercalcemia with irradiated ergosterol in pulmonary tuberculosis. He felt that "activated ergosterol may favor fibrosis and hasten absorption of tuberculous infiltration." He found that adult cases of pulmonary tuberculosis tolerated a hypercalcemia of 15 mg./per cent, and was the first to suggest the use of intravenous sodium bicarbonate to control toxic symptoms.

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In 1945, Levinson[18] reporting on 500 cases of tuberculous meningitis seen at Cook County Hospital, Chicago, stated that only three recovered. Two of these had received massive doses of vitamin D and calcium.

Gounelle and Bachet[19] reported in 1946 on 5 cases of pulmonary tuberculosis treated with massive and prolonged doses of vitamin D_2. Usually the chest X-ray became worse during the first week, followed by a gradual improvement. They were impressed with the lack of progression to an expected fatal outcome in cases with serious bilateral tuberculosis which were beyond aid through thoracoplasty, although cavities did not fill up and the fibrous lesions did not change.

Cutaneous Tuberculosis and Vitamin D_2

Fanielle[3] used irradiated ergosterol in the treatment of human tuberculosis and after 12 years of observations concluded that it was of distinct value. In 1942 he reported favorable results in 4 cases of lupus vulgaris, 2 cases of ulcerated tuberculosis and 1 case of varrucous cutaneous tuberculosis. These findings were confirmed by Alechinsky[20] who reported the cure of several cases by the same method.

Credit for focusing medical attention on this subject, however, is usually given in the French, English and Spanish literature to Charpy of France. In 1943 he[1a] reported 27 cures of lupus vulgaris treated with calciferol in a glycero-alcoholic solution (sterogyl). About two-thirds required additional destructive therapy to complete the cure. Charpy noted that the results were rapid with a definite change in the first week. Surrounding lymphangitis and adenitis were quickly reduced, but the cutaneous nodules were more resistant and often required cauterization. He supplemented the vitamin D_2 with the calcium contained in 1 to 2 liters of milk daily.

Using the "Charpy method," Gougerot and Gaullier[21] obtained cures in 20 out of 35 cases. There was no change in 4. They attributed their relative lack of success to the fact that their patients were hospitalized for other diseases and had less resistance. Huriez and Leborgne[22] reported excellent results in 7 of 15 cases of lupus vulgaris. Four were very much improved and 4 were failures, 3 of which were attributable to bad social conditions.

Similar results have been reported by Garrie,[23] Bureau, Yves and Barriere,[24] and Vachon.[25] Also using the Charpy-Fanielle method, Meyer, Gaulier and Desgrez[26] followed 148 of 300 cases of lupus vulgaris at the Finsen Institute of which over 75 per cent were greatly improved, but nearly all required additional local care. They did not observe a single serious case of vitamin D intoxication.

Working independently in England Dowling and Prosser Thomas[2] began treating lupus vulgaris with calciferol in 1943. They reported 18 of 32 cases as cured, 9 much improved, and 5 not greatly improved. Using the method of Dowling and Prosser Thomas, MacCrae[27] reported cures in 14 of 20 cases of lupus vulgaris. The average duration of the disease before treatment in MacCrae's cases was 19 years. During treatment he noted a reaction during the first two or three weeks, particularly that "the patches became angrier and isolated nodules more scarlet, with an increased tuberculin reaction and sedimentation rate." A steady improvement was usually noted following this reaction. Bell[28] in 1946 reported cures without reaction in two children with tuberculous adenitis.

Vitamin D_2 (Calciferol)

In 1938 Bills[29] pointed out that at least ten different compounds have antirachitic qualities, and therefore merit the name vitamin D. Only two, vitamin D_2 (calciferol) and D_3 (7-dehydrocholesterol) are known to be of prime importance to medicine. When ergosterol is irradiated with ultra-violet light, calciferol is one of the products, as shown by Bills' modification of a scheme given by Setz:

Ergosterol
| UVL
Lumisterol (not anti-rachitic)
| UVL
Tachysterol (not anti-rachitic)
| UVL
Calciferol (vitamin D_2—anti-rachitic)
| UVL
Toxisterol (doubtful anti-rachitic activity,
but with toxic properties)
/ \
Suprasterol I Suprasterol II

In 1939 Reed, Stuck and Steck[35] emphasized that many reports on toxic reactions to vitamin D in the period from 1928-1930 were probably due to the high concentration of toxisterol. To prevent reactions from vitamin D_2 and to obtain the best clinical result in the treatment of cutaneous tuberculosis, most investigators insist that it be in its most refined form, and in an alcoholic solution. Marsh[31] stated that the synthetic calciferol preparations made in England are less toxic than the natural vitamin D_3 found in fish liver oils, whereas the calciferol prepared by irradiating ergosterol was often incompletely purified and contained toxisterol. Charpy[1] found that vitamin D_2 in an oily base did not give consistent results. Mayoux[32] stated that vitamin D_2 in oil was "constantly ineffective" while excellent results were obtained with vitamin D_2 in an alcoholic solution.

Dosage. The Charpy method, used extensively on the continent, consists of the oral administration of 600,000 units of vitamin D_2 in a glycero-alcoholic solution as follows: Three times during the first week, twice weekly for the next 3 weeks, and once each week during the following 4 months. Charpy considers a high calcium intake a necessary adjunct to calciferol therapy. His patients received from 1 to 2 liters of milk daily, or if this was impracticable, 0.5 gm. of calcium gluconate daily by mouth for 20 days of each month.

Dowling and Prosser Thomas varied their dosage scheme according to the patient. The maximum daily dose was 150,000 units; this was reduced to 100,000 units daily after varying periods and further reduction to 50,000 units was sometimes made. They did not find supplemental calcium to be of additional value.

Our treatment at the University of Minnesota Hospitals combined the French and English methods. At first we used viosterol in oil in a dosage of 150,000 units daily. An adequate intake of calcium was assured by having the patients drink at least one quart of milk daily. More recently we have changed to a solution of vitamin D_2 in propylene glycol (Drisdol)* which was especially prepared for us in a form containing 50,000 units of vitamin D_2 per cubic centimeter. As propylene glycol is water soluble and more readily miscible with the gastric contents, it is felt that more beneficial results might be obtained with this vehicle. Therefore we now use (between 1000–2000 units per kilogram of body weight per day) vitamin D in propylene glycol. We use 1,000 units per kilogram in bedridden patients, and are careful not to use massive doses of vitamin D_2 in any patient with arteriosclerosis, nephritis or any form of urinary stasis. The toxic dose is about 20,000 units per kilogram of body weight per day.[35]

Reactions. In spite of improvement in vitamin D preparations, reports on vitamin D intoxication continue to appear in the literature. The symptoms commonly noted are anorexia, nausea, malaise, post-auricular headache and urinary frequency. In 1946 Covey and Whitlock [33] reported 5 cases of intoxication, 2 of the patients having arteriosclerosis and hypertension, which are usually considered to be contraindications to massive vitamin D therapy. Bauer and Freyberg [34] listed 6 reports on vitamin D toxicity, on 6 different types of vitamin D preparations. Steck, Deutsch, Reed and Stuck [30] reported that of 773 humans (adults) treated with over 100,000 units of vitamin D daily 8 per cent had symptoms of intoxication. The duration of treatment varied from 87 days to 2 years. There were no deaths.

Reed [36] and Bicknell and Prescott [37] emphasized that symptoms of intoxication did not always go with hypercalcemia. Both animal and human experiments have demonstrated toxicity without hypercalcemia and hypercalcemia without toxicity.

Enormous doses of vitamin D have been used in the treatment of chronic arthritis and psoriasis. Wyatt, Hicks and Thompson [38] used 300,000 units daily in arthritis, and Ceder and Zon [39] a similar amount in psoriasis, noting a progressive hypercalcemia. Farley [40] used up to 1,000,000 units daily in arthritis, and stated that toxic symptoms seldom developed if the dose remained under 400,000 units.

We feel that reactions to vitamin D_2 in the treatment of cutaneous tuberculosis fall into two groups. The first is the local flare-up, likened to the Herxheimer reactions of syphilis, seen at the site of the disease. The second group is more purely a vitamin D_2 intoxication. Dowling and Prosser Thomas, in surveying the literature, found that a sense of well-being and a good appetite appeared often to be a prelude to later symptoms of intoxication. Mental depression and headache may also be early symptoms. Excessive doses may mobilize phosphorus and calcium, producing metastatic calcification of soft tissues, particularly of the renal tubules and arterioles.

In our patients very few toxic symptoms were noted. A local flare-up was noted once. In two patients anorexia and mild transitory mental depression were seen.

Mode of action. The exact action of calciferol on cutaneous tuberculosis is unknown. Two attempts to determine the bacteriocidal action of vitamin D have resulted in conflicting results. In 1937 Steenken and Baldwin[41] added 100-400 units to cultures of the tubercle bacillus (H_{37} strain), and, after a period of growth, inoculated guinea pigs with the suspension. Tuberculosis usually resulted. On the other hand, in 1946 Raab [42] showed a complete absence of growth of tubercle bacilli in cultures to which calciferol in propylene glycol had been added. Controls using the propylene glycol alone showed unchecked growth.

In support of the theory of a direct action on the bacillus is the not too infrequent local reaction seen immediately after starting treatment. This is similar to the Herxheimer reaction of syphilis, and apparently occurs in up to 20 per cent of the treated cases. The reaction was so marked in one of our cases of scrofuloderma (Case of Dr. E. T. Ceder) that it was necessary to stop treatment. A case of lupus vulgaris was presented at the Chicago Dermatologic Society in January, 1946, in which tuberculids appeared during treatment, indicative of an allergic response to therapy.

Prosser Thomas [43] reported that local treatment of lupus vulgaris with calciferol had no effect.

The calcifying action of vitamin D_2 may be the responsible factor in the improvement, this has not been verified nor entirely disproved. However, Charpy and Dowling have not been able to correlate hypercalcemia with clinical response. They had a number of patients who improved rapidly with no change in the calcium levels. Vachon and Feroldi [44] reported the post-treatment histologic studies on Charpy's patients. He found no evidence of local calcium deposits, and, only rarely, cure in the histologic sense. A general increase in fibrosis was noted which had a "suffocating" effect on the tubercles. Mayoux and Martin,[45] studying 70 post-treatment biopsies found that anatomic cure occurred several months after clinical cures. At no time was calcium demonstrated in their post-treatment sections. A change in the tuberculin reaction was noted by Charpy [16] who felt that this was further evidence for a direct action on the bacillus. He noted a change from strongly positive mantoux reaction to negative in 2 of 11 cases tested after treatment with vitamin D_2.

Distribution of vitamin D_2 in the body would seem important if its effect were to be noted in the various organs infected with tuberculosis. In 1939 Vollmer [46] administered 1,000,000 units of vitamin D in 3½ days to a dying infant. After death the various organs were bio-assayed for the presence of vitamin D. He found that the major portion was stored in the brain, liver and skin. No appreciable amounts were found in the lungs, spleen or bones. Windorfer,[47] reported a similar experiment in 1938. He found that most of the vitamin D was stored in the brain and kidney.

CASE REPORTS

We have administered vitamin D to 9 patients with cutaneous tuberculosis. They have been under observation for a period varying from 2 to 9 months. The small number of patients and the short period of observation makes this no more than a preliminary report. Three cases of lupus vulgaris, 4 cases of erythema induratum, 1 case of papulonecrotic tuberculid, and 1 with scrofuloderma, are included in the study. All with the exception of the papulonecrotic tuberculid and the scrofuloderma were old cases which had resisted previous treatment.

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*Furnished by the Winthrop Chemical Company.

Case 1. S. R., male, weight 150 pounds, 25 years of age. First treated at Dermatology Out-Patient Department in June, 1939. Lupus vulgaris on the left cheek since 4 years of age. Biopsy confirmed diagnosis. Chest X-ray revealed an old healed fibrotic lesion. The lupus vulgaris was previously treated with cautery, starch injections and ultraviolet light. Temporary improvement was noted in August, 1939, following a blistering dose of ultraviolet light. Vitamin D started May 6, 1946, using 150,000 units of vitamin D with 2 quarts of milk daily. Improvement was noted in June, and marked improvement in September 1946.

Case 2. Mrs. R. L. (Case of Dr. Robert Priest and Dr. Carl W. Laymon), 60 years of age. She was seen first on 6-5-42 with obstruction of the left nostril for 2 months, with left epiphora. A rough, granular overgrowth of tissue was noted on the spetum and lateral wall of nose. Biopsy was made 6-8-42 and reported as tuberculosis of the skin (lupus vulgaris) by Dr. E. T. Bell. Chest plate negative. Seen again on 6-10-46 with progression of lesion to upper lip. Vitamin D_2 (calciferol) started 8-7-46, using Charpy method. On 9-11-46 lesion was smaller. On 10-21-46 there was marked improvement. Dr. Priest reported on 11-15-46 that she "seemed to be completely healed."

Case 3. E. A. (Case of Dr. John F. Madden), male, 48 years of age. Lupus vulgaris of the buttocks for 31 years. Several plastic operations. Cervical abscess at 9 years of age. Biopsy May 7, 1945, was tuberculosis of the skin (E. T. Bell), Mantoux positive. Chest X-ray negative. Previous treatment consisted of ultraviolet light, penicillin, and tyrothricin. Vitamin D (calciferol in propylene glycol) began 10-12-46. Improvement noted in two weeks. Almost completely changed to scar tissue in two months. Post-treatment biopsy showed scar tissue and no evidence of tuberculosis.

Case 4. E. L. (Case of Dr. Henry E. Michelson), female, 30 years of age. Papulonecrotic tuberculid of right cheek for one year. No previous treatment. Mantoux strongly positive. Chest X-ray revealed a calcified scar. Calciferol in propylene glycol started in November, 1946. Improvement noted in 2 weeks on 150,000 units of vitamin D_2 daily. Her blood calcium level was 15 mg./per cent in 6 weeks, and therapy was stopped. No recurrence noted in one month.

Case 5. E. M. (Case of E. T. Ceder). Female, 50 years of age. Scrofuloderma, right neck, for 2 years. During first week of calciferol therapy, the adenitis and drainage increased markedly and it was necessary to stop therapy.

Cases 6, 7, 8, 9. (Cases of Dr. H. E. Michelson.) These 4 cases were all females with erythema induratum. Response to vitamin D_2 was immediate in all four cases. One case relapsed after the treatment was stopped. Duration of treatment in this case was only 4 weeks.

SUMMARY

The literature concerning the use of vitamin D in cutaneous tuberculosis is reviewed.

A modification of the methods suggested by Charpy, Dowling and Fanielle was used in 9 cases. Our series is neither large enough, nor has sufficient time elapsed for any conclusions to be drawn, other than to state that vitamin D therapy was definitely helpful, with one exception, in all cases.

The use of propylene glycol as a vehicle for calciferol is suggested. (Drisdol).

It is emphasized that in addition to the usual reactions to vitamin D, Herxheimer-like reactions are often noted at the site of the disease, indicating a possible direct effect on the tubercle bacillus.

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CITY-WIDE CHEST X-RAY SURVEY

Organization of Minneapolis into 30 districts for the city-wide free chest X-ray survey to start about May 5 was scheduled by a promotion and educational planning committee meeting.

Swinging into a "grass roots" program with the aim of surveying every Minneapolis resident over 15 years of age, the committee was expected to adopt a proposal which will set up a central committee of both lay and professional leaders. They will work with subcommittees to be named for each of the districts.

The survey will be concerned primarily with the discovery of tuberculosis cases among Minneapolis residents. In addition, certain conditions of cancer and heart diseases can be diagnosed.

Starting early in March and continuing until the actual survey is under way, speakers will appear in the various districts, movies will be shown and workers will tell residents where X-ray units will be stationed. More than 250 locations already have been spotted.

Final plans call for enough locations so that no resident will have to go more than four blocks for his X-ray.

The work will be carried on through both day and evening hours. Reports on individual cases will be confidential. It is estimated the survey will take from eight to twelve weeks.

The Minneapolis survey is sponsored by Hennepin County Medical Society and Hennepin County Tuberculosis Association.

STAFF SEMINAR

Bronchiogenic Carcinoma of the Lung

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All students of medical literature of the past 25 years cannot help but be impressed by the fact that here is a disease entity which has emerged from a medical rarity to become a frequent and major destroyer of life in man. Twenty-five years ago most medical schools devoted but passing reference to the teaching and study of primary carcinoma of the lung—as a medical rarity not often to be encountered in the course of the lifetime practice of the student. Today the curricula of all schools give to this subject a considerable portion of attention. Of neoplastic disease, it ranks in frequency with carcinomas of the large bowel.[19]

Although a complete understanding of this disease in all its aspects is far from complete (as is the comprehension of the whole picture of neoplastic diseases) the known facts may enable us to recognize its presence as early as possible even though we still be at a loss to halt its appearance. Since the only hope of prolonging life (if not cure) for victims of this disorder lies in a radical surgical approach early in the disease, it is evident that early diagnosis is essential. This is the more difficult since the disease is often insidious in its attack and may progress for some time in silence.

History

Every student of this disease is intrigued by the early reports in the 16th century of the respiratory malady of the miners of Schneeberg, Saxony. The disease was referred to as "miners disease" or "mountain disease." Its pathological picture was not clearly understood. Some of the early authors believed it to be of tuberculous origin while others considered it to be a lymphosarcoma of the bronchial lymph nodes. That the disease was bronchiogenic carcinoma was first established by Harting and Hesse in 1879 and that has been corroborated by many workers since: Cohnhein in 1882, Aucke in 1884, Arnstein in 1913, Uhlig in 1920, Risel in 1921 and Rostocki, Saupe and Schmoral in 1926.[19]

Much work was done on the study of bronchiogenic carcinoma in the Schneeberg Miners and in 1926 a Committee on Cancer Research in Saxony studied 154 of these miners. In a period of four years, 15 of these died of bronchiogenic carcinoma. There were 6 other deaths in this group, of other causes. A thorough analysis of the dusts of this mine were made. They were shown to contain bismuth, nickel, cobalt, arsenic, fungi, and radioactive materials. There was variation of opinion as to which was the offending agent. That much silica dust was present was also proven. That many of the miners suffered from varying degrees of pneumoconiosis was likewise known. However, a case against this underlying lung irritation from a chronic pneumoconiosis could not be made as the incidence of bronchiogenic carcinoma among the Schneeberg miners was statistically greater than in other sufferers from this underlying irritative disease. The cause remained enigmatic.

The first classical description of the disease was presented in 1761 by Morgagni. By 1878 Reinhardt collected 28 cases from the literature and in 1912 Adler in this country collected 374 recorded cases.[19]

Etiology

It must again be emphasized that we are as far from discovery of the direct cause of this type of cancer as we have ever been. The primary cause is still unknown.

Since 1920 there has been a marked increase in the death rate from this disease. Some investigators have tried to account for this as an apparent increase due to greater awareness and increased diagnostic acumen.[16] A careful analysis of the vital statistics indicates that this increase is real and considerable.

In a review of autopsy material at Yale University from 1917 to 1937, a study of 4,114 cases was made. While only 2,968 of these were of persons over 20 years of age, 435 carcinomas were found in 425 persons. An analysis of these cases by decades showed that in the period 1917-1926 of 136 cases of carcinoma, 10 were primary carcinoma of the lung. From 1927 to 1937 there were 299 carcinoma cases of which 33 were bronchiogenic carcinoma. It rose from the fifth most common tumor in the 1917-1927 period to the second most common in the period 1928-1937.[18]

Many workers and studies have confirmed the opinion that the incidence of this disease is definitely on the increase and that this increase is apparently reaching its peak now. A similar increase in frequency of this disease has been reported from all the European countries and from Canada.

Simons in his monograph on this disease states, "It is apparent that the evidence permits of no other conclusions than these: first, that incidence of the disease has increased both absolutely and relatively; secondly, that continued suggestions that such an increase is only apparent and not real are rebuked by the facts; third, that the increase was gradual until 1900 since when the gradient of increase has become constantly steeper; finally, that in many localities the greatest incidence seems to have been reached in 1924, while in others the frequency still is advancing."[19]

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*Veterans Administration Hospital, Minneapolis.

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Incidence

Heredity. The role of heredity in cancer has intrigued many authors and there is some experimental evidence that "cancer strain" mice can be bred, in whom cancer predisposition is a dominant characteristic. There is also some statistical evidence to prove that cancer histories are somewhat more prevalent in cancer patients. We may conclude that heredity can, at most, impart to the victim a predisposition which must be activated by some other etiological agent.

Sex. All authors report an incidence of 3 or 4 males to 1 female in large series of bronchiogenic carcinoma. Leddy and Moersch in a series of 500 cases at the Mayo Clinic reported 4 men to every woman.[13]

Age. The youngest case of bronchiogenic carcinoma was in a child 16 months old, reported by Beardsley in 1933. Simons reviewed the reports of 2,796 cases and concludes that 80 per cent of all these carcinomas occur between 40 and 70 years of age, with 30 per cent between 50 and 59 years of age.

Lung Irritation. Many types of lung irritants have been suspected and studied. These may be grouped as mechanical, such as trauma; chemical, as specific dusts and fumes; infections, such as tuberculosis, influenza, common cold, abscess and bronchiectasis; radioactivity and thermal.

While all of these may be suspected, none can be indicted and convicted.

Since pipe smokers often are victims of carcinoma of the lip it was thought that a case was made against tobacco, as the disease was noted more frequently in man. However, of recent years women have been smoking at least as much as men and no increase in the incidence of bronchiogenic carcinoma in women is yet apparent.

The role of bronchial irritation cannot be taken too seriously. It is to be remembered that in a modern community we are all constantly bombarded with coal dust and car fumes, but with the exception of the Schneeberg miners, no segment of the population seems more prone to the disease than another. There is no significant statistical difference in incidence between rural and urban population, between the north, south, east or west.

It is to be remembered that perhaps the most common pathological finding at autopsies is chronic inflammatory involvement of the bronchial and mediastinal lymph glands. So that apparently our bronchial tree is constantly invaded with bacterial and virus irritants. Unless a specific agent is necessary, irritation is too common and constant to be blamed too severely.

One factor may be of importance, though proof is not yet at hand: a predisposition or special susceptibility or a lack of a resistance factor may account for the occurrence of the condition in one and not in another. Yet this special condition of the host must be one which is acquired or lost, else it would be hard to explain why so many can go for so long without acquiring the disease.

Pathology

A recent review of 33,308 autopsies revealed that primary carcinoma of the lung occurs in about 0.2 per cent and that bronchiogenic carcinoma comprises about 1 per cent of all carcinoma, and is responsible for 2 per cent of deaths from pulmonary disease.[8]

Table 1

	Total
Organic Metastasis:	
Liver	510
Bones	305
Kidney	280
Adrenals	256
Brain	223
Pancreas	81
Thyroid	60
Spleen	49
Intestines	40
Skin	27
Dura Mater	23
Peritoneum	22
Ovaries	21
Stomach	10
Gallbladder	6
Regional Metastasis:	
Lungs	336
Pleura	240
Pericardium	100
Heart	77
Lymphatic Metastasis:	
Mediastinal	269
Cervical	89
Abdominal	65
Hilar	400
Axillary	36
Supra Clavicular	20
Total	1554

All series seem to agree that the right lung is more frequently involved than the left. Also, statistics give a greater incidence in the upper lobes than the lower. While the usual occurrence of the disease is in the hilar area about 20 per cent occur in the parenchyma or the peripheral regions.[11]

Macroscopically the tumors vary from very small point-like lesions to lesions occupying a whole lung. Frequently the lesions are multiple and occasionally miliary in type. Primary bronchiogenic carcinomas have been found so small in size that symptoms and death have been produced from the metastases alone.

On cross section, most of the tumors are gray white or pink and, if large, may have necrotic centers not unlike caseous tuberculosis nodules. Occasionally they may contain single or multiple cavities filled with slimy or mucous material.[2]

Metastases are common both by lymphatic and vascular routes. In the great majority of cases the peribronchial and mediastinal glands are involved. It has been said that next to mammary carcinoma, bronchiogenic carcinoma is the most frequent origin for intracranial metastasis.[2] Like lung abscess, carcinoma of the lung has a strong predilection to produce brain embolic implants. By direct spread from the hilus and by vascular showers the parenchyma of the lung is often invaded with metastatic lesions which may be larger than the primary site. It is now recognized that most of the cases formerly diagnosed as pleural endothelioma are probably pleural implant metastasis of bronchiogenic carcinoma.[2] In such cases pleural effusion is common. It is usual to observe that the first pleural aspiration may be amber or straw colored and clear, but subsequent taps within days may be blood-tinged or completely bloody. In such cases occasionally carcinoma cells or clusters can be found in the centrifuged fixed sediment. In general, a bloody pleural fluid in a known case of bronchiogenic carcinoma indicates pleural implants of the disease and this condition precludes successful surgery in such cases.

The tumor, although small, may diminish or obstruct the lumen of a bronchus. In such event atelectasis of a portion of the lung will ensue. As a matter of fact, this may be the only indication of the presence of a tumor. A patient between the ages of 35 and 60 who suddenly develops an area of atelectasis or is presumed to have an unresolved pneumonia should be strongly suspected of having a primary carcinoma of the lung.

Metastases have been known to involve practically every structure and organ in the body. Table 1 gives an analysis of the recorded metastasis in 1554 cases analyzed from the literature by Simons.[19]

Microscopic Classification

There is still much confusion among pathologists as to a definite pathological classification of this disease. However, some of this confusion is resolving itself. The great bulk of lung tumors which the English school had popularized as "oat cell tumors" and were long suspected of being sarcomas, are now generally recognized as an undifferentiated cell type of bronchial carcinoma.

Another type over which there is still considerable stormy dispute is the so-called "alveolar carcinoma." Those who hold that this type represents a distinct entity, argue that this carcinoma had its origin from the alveolar epithelium. This school has gone to great lengths to prove that the alveolus has a distinct epithelium and that this layer of cells is capable of metaplasia and carcinomatous metamorphism. The opposing school holds that the alveolus is in reality naked; that what cells are seen are extensions of bronchiolar epithelium or are elongated mesodermal elastic tissue cells. This school of thought argues that what appear to be alveolar carcinomas are in reality extensions of neoplastic growths arising from the lining cells of these terminal bronchioles. Dr. Bell of the University of Minnesota states: "Some writers exclude the alveoli as a possible source, since they do not believe they have an epithelial lining. There is, however, abundant evidence of alveolar epithelium in pathological material, and alveolar carcinoma should not be excluded on this basis. In fact, a few human pulmonary carcinomas have been reported in which an alveolar origin is highly probable—these exhibited multiple foci of origin not connected with bronchi (Weisman)"[1]

Boyd[2] who does not share the alveolar epithelium opinion has this to say on this subject: "In rare cases a miliary form may occur with small nodules scattered throughout the lung. I have seen two cases which I place in this category in which the tumor appeared to have a multicentric origin. One must, however, admit a two-fold possibility of error: (a) the tumors may be metastatic from a small undiscovered carcinoma in some other organ; (b) a small primary in a peripheral bronchus may not be detected and the nodules may be due to lymphatic spread throughout the lung. Multiple tumors have been described under a variety of names: alveolar cell tumors (Neuberger), carcinoma alveogenica culticentrica (Casilli and White), and so forth. Such names suggest an origin from the cells lining the alveoli. The tumor cells line the alveoli, but do not necessarily arise from the lining. More readily accepted because of its benign character is the condition of adenomatosis of the lung described by Richardson, in which small nodules were scattered throughout both lungs. These nodules consisted of glandular spaces lined by mucus-secreting columnar epithelium, which probably represented a downgrowth of bronchial epithelium into the alveoli."

This difference of opinion on alveolar carcinoma is found throughout the writings of pathologists. There does seem to be some slight preponderance of weight toward the bronchial epithelial origin theory. Fried[5] in his monograph on carcinoma of the lung propounds the unicellular origin of lung carcinoma which has gained wide acceptance and on which the present classification of the disease is based. From his studies he was led to the conclusions: (a) that the walls of the alveoli are virtually "naked" and the cells found in groups in the septa are mesenchymal in origin; (b) that the lining of the bronchial epithelium is made up of columnar or squamous cells and glandular cell structures composed of goblet cells and ciliated columnar cells; (c) and that these lie upon and arise from a basal cell which is the true germinal cell; (d) and that these basal or germinal cells are the sole source of growth and therefore of carcinoma cells.

On this basis a histopathological classification is made in which the least differentiated type is the round or spindle cell tumor (formerly referred to as "oat cell"), and as differentiation is attempted, it moves to the adenocarcinomas in one direction and to the squamous cell type in the other. In truth, all three types are frequently seen in various parts of a single tumor, though one will usually predominate. The degree of malignancy is said to run roughly inversely to the degree of differentiation; thus, the round or spindle cell type would be most highly malignant; the adenocarcinoma and the squamous cell type reduced in malignancy as they approach the mature type of structure.

Whether we accept alveolar carcinoma as a separate pathological entity or classify these as bronchial carcinomas of the miliary type, it is well to keep in mind that they present a different clinical picture from the usual bronchiogenic carcinoma. In general, the records of this type of lesion are scanty and diagnosis of those reported is made at the postmortem table. We have had two such cases at our hospital. In one, the condition was not recognized during life. In the other, the diagnosis was suspected and noted in the record some ten months before death.

The characteristic picture in this lesion is its multicentered origin, often bilateral and involving many lobes. The bizarre X-ray picture is frequently the first finding as the disease can extend considerably without clinical signs or impairment of health. Later there will be episodes of cough, increasing weakness, dyspnea on exertion of even mild effort and blood streaked sputum. Because of the X-ray findings of scattered variable sized cotton-ball densities distributed through many lobes and the lack of severe cachexia, tuberculosis is usually suspected. The lack of tubercle bacilli in the sputum or gastric washings after persistent examinations and the rapid progress of the disease, the marked and advancing X-ray evidence of lung pathology, should make one suspicious of this type of lung carcinoma. In many cases a hemorrhagic pleural effusion may develop, and if carcinoma cells can be found in the sections of the fixed centrifuged specimen, or if occasionally carcinoma cells can be identified in the sputum, the diagnosis can be established.

A word should be said of the "superior pulmonary sulcus tumor" of Pancoast, often called the "Pancoast tumor." In 1924 and 1932 Pancoast reported and described cases of apical chest tumors which he believed to be a separate entity giving a characteristic clinical and pathological picture. He described these tumors as occurring at the thoracic inlet, giving pain around the shoulder and down the arm, and producing a Horner's syndrome (miosis, ptosis, enophthalmos and anhydrosis), local rib or vertebral destruction and atrophy of the muscles of the hand. Pancoast believed these tumors to arise from embryonal rest of the fifth branchial cleft.

These tumors have been shown on repeated occasions to be non-specific. Eight cases were analyzed at the Bellevue Hospital in New York. In three cases the tumor was either bronchiogenic or metastatic carcinoma. One was an epithelial neoplasm and neurofibroma arising from the brachial plexus and two of incomplete pathological studies.[7] The consensus at present is that the Pancoast tumor is not a specific entity, that any tumor in this area may simulate it, and that when rib or vertebral destruction is demonstrated, it is probably a bronchiogenic carcinoma and that surgery is of no avail.[11]

Symptoms

It may be said that carcinoma of the lung is often a painless disease. Any pain that is encountered in this disease is due to metastasis or pressure of enlarged nodes on afferent pain fibers.

In general the symptoms may be divided into two groups: (a) obstruction or ulceration of a bronchus, and (b) the symptoms of its metastasis. The most common result of ulceration is hemorrhage, most frequently noted as blood streaked sputum. The results of obstruction may be so slight as to produce only a wheeze on exertion or deep respiration, often associated with a small persistent thick sputum or a cough, at first dry and later productive. If the obstruction is more severe, it may act as a ball valve with eventual absorption of the air behind it, producing an area of atelectasis. Or, acting as a check valve, it may allow air in but obstruct its outflow, resulting in bronchiectasis and abscess and areas of secondary emphysema.

Local metastasis will produce signs of hilar pressure if the peribronchial glands are enlarged, or may produce any of the signs of mediastinal tumor when the mediastinal glands are enlarged; thus producing substernal or vertebral pain, hoarseness, difficulty in swallowing, pulmonary hypertension, and so forth, all the signs and symptoms of increased pressure in various areas of the mediastinum.

Peripheral metastases will produce early evidences of pleural friction, occasionally diaphragmatic referred pains and pleural effusion (at first clear, later hemorrhagic).

Thus the usual symptoms may be summarized as those due to bronchial irritation, persistent cough at first non-productive, dyspnea, and general weakness and blood-stained sputum.

As the bronchus becomes occluded we get evidence of atelectasis with displacement of the trachea and heart to the affected side. As bronchiectasis develops we get increasingly productive cough which later produces foul, fetid sputum, and as some absorption takes place, irregular periods of elevated temperature. Tumor cells may be found in the sputum on rare occasions.

Frequency of Symptoms in 1456 Cases [19]

Symptoms	Cases	Percent
Cough	996	72.3
Sputum	822	67.5
Pain	861	59.8
Dyspnea	716	59.7
Cachexia	573	48.2
Pyrexia	477	42.8
Hemoptysis	583	48.4
Dilated Veins	57	19.3
Cyanosis	51	18.5
Edema	50	18.3
Night Sweats	47	18.0
Vomiting	32	10.5
Dysphagia	32	10.5
Hoarseness	25	6.9
Clubbed fingers	20	5.9

Physical Findings

Usually no physical findings of the tumor itself can be elicited, as in most cases the offending tumor mass is relatively small. The signs obtained are those of the effect of the tumor on the bronchus. Since 80 per cent of these tumors arise near the bifurcation of a primary or secondary bronchus, occlusion or pressure on this bronchus produces secondary pathology such as atelectasis, bronchiectasis, abscess or emphysema in a considerable portion of lung tissue. The physical findings obtained will usually be of these secondary pathological processes. The earliest sign will be a small area in which wheezing may be heard, usually over or near the hilus area of the lung posteriorly. This would be just to the right or left of the transverse processes of the third to the seventh thoracic vertebrae. This sign, however, is of very little clinical value as it is too often caused by other conditions such as chronic bronchitis, asthma and tuberculous strictures.

The physical signs of bronchial obstruction may closely simulate signs of pleural effusion. The breath sounds will remain vesicular in quality though they may be distant or, on occasions, absent, while in pleural effusion the breath sounds will often be bronchial, though there is no egophony. The percussion note over the involved area in both conditions will be very dull to flat. If the atelectasis is large the heart can often be shown to be pulled to the affected side by percussion of its borders.

In bronchiectasis physical signs may often be absent. Occasionally coarse, moist rales and distant breath sounds may be elicited over the lobe of the lung involved. When abscess is associated, the inflammatory reaction in the lung will give the physical signs of lobar pneumonia.

While many of the older clinicians go to great lengths to describe the minutia of differentiation in the findings of carcinoma of the lung, it is well agreed now that diagnosis of this condition requires some of the newer mechanical aids to establish clinical evidence of value in making a diagnosis of bronchiogenic carcinoma.

These aids are radiographic and fluoroscopic chest examination, including such additional refinements as multiple view exposures of the lungs, planography, bronchography after the instillation of lipiodol, and occasionally fluoroscopy after the establishment of pneumothorax or pneumoperitoneum.

The second important diagnostic aid is endoscopy, by which means the tumor can often be visualized, its location in the bronchial tree determined and biopsy specimens removed for pathologic study. A positive biopsy makes the diagnosis certain.

While we are discussing the physical signs of this disease we should recall the findings in the "superior sulcus tumor" of Pancoast. Again I would emphasize that this tumor has been shown on numerous occasions to be a primary carcinoma of the lung. Because of its location it does give a definite clinical picture. Occasionally, a small mass may be palpated in the pulmonary apex just above the clavicle. This is not usual. It does produce pain about the shoulder often radiating down the hand, atrophy of the muscles of the hand or arm, paralysis or paresthesia of the forearm and a Horner's syndrome. X-ray will show a round density in the apex, just to one side of the midline in the posteroanterior view with often destruction of portions of the first or second ribs or upper thoracic vertebral bodies.[15]

Other findings in the examination of bronchiogenic carcinoma will be dependent upon its spread and metastasis. A few of these should be mentioned. It is to be remembered, however, that metastasis from this lesion may affect practically every structure and organ in the body, so that an unlimited variety of findings may be encountered.

The tumor or its lymphatic extension may cause paralysis of the recurrent laryngeal nerve giving paralysis of the vocal cord. Persistent hiccoughs may signify involvement of the phrenic nerve, or paralysis of the diaphragm may be noted.

A bronchial fistula may result from necrosis and cavitation of the tumor. The tumor may erode through the esophagus and produce evidence of esophageal obstruction, perforation, or occasionally, an esophageal-bronchial fistula. Cerebral neurological manifestations due to brain metastases are common, and occasionally may be the first findings. Evidence of pleural effusion is common, usually late in the disease.

The clinical laboratory is not helpful in a diagnostic way except for the finding of actual tumor cells in the pleural fluid or the sputum and the positive identification of the pathology in endoscopic biopsies.

X-Ray. One of the most useful means for establishing evidence of this disease is through the use of the X-ray. Ruggles and Holmes state: "The usual growth in carcinoma occurs in two types, nodular and infiltrating. The former consists of dense, rounded masses, sharply marked off from the lung tissue, occurring near the hilus. Ragged, irregular cavity formations in the tumor mass sometimes occur. In the infiltrating type the tumor arises from a bronchus and infiltrates the lung along the bronchial ramifications. The growth may be confined to the bronchial tree so that it appears as an increase in density of the lung markings in the affected area, or it may involve surrounding lung tissue and be seen as a mass with fairly smooth edges except along the advancing margin which is irregular and tends to grow in the direction of distribution of the affected bronchi."[9]

Occasionally the enlarged peribronchial glands will be seen as rounded masses about the hilus on the affected side, or involvement of the mediastinal glands will be visualized as a thickening of the mediastinal shadow just below the aortic bulge. These are often hard to distinguish radiologically from Hodgkin's disease of lymphosarcoma.

When the bronchus is occluded by the tumor mass, an area of atelectasis will be demonstrated on the roentgen picture as a wedge-shaped area of density limited to one lobe or lobule with the trachea and heart displaced to the affected side.

Any area of atelectasis occurring in a man between the ages of 30 and 60 without any definite cause should be considered as the result of a carcinoma of the lung until proven otherwise.

Bronchiectasis is often impossible to visualize on the routine X-ray picture of the chest. However, the lung abscess often resulting can be visualized. In the acute stage it will appear similar to an area of lobar pneumonia. However, it fails to undergo resolution in the manner of pneumonia, and radiographically shows increasing densities with sharper margins of delineation often developing evidence of cavity formation and frequently showing a fluid level.

Alveolar carcinoma, because of its multicentric origin will show up as multiple, irregular-sized, rounded cotton-ball-like densities scattered through many lobes, often bilateral. It can be mistaken for miliary tuberculosis or metastatic carcinoma of the lung. The lack of other evidence of tuberculosis, the lack of another primary tumor and the relatively chronic course should make one suspect this condition.

With the recent use of planogram techniques the lumen of the primary bronchi can be visualized fairly adequately. The right and left bronchi usually show up at about the 13 cm. level. Occasionally a definite occlusion or a filling defect can be demonstrated protruding into the bronchial shadow. Unfortunately, this technique has not had widespread use so that its value must await some future jury's verdict.

Whenever densities are produced in the X-ray film of the chest, it is important to check them with lateral and oblique views of the lungs. By this means the location of the masses may be more accurately determined and extrapulmonary shadows differentiated. However, occasionally it is necessary to take a picture after the production of pneumothorax to differentiate between intra- and extrapulmonary shadows. Especially is this true in apical lesions where neuromas and neurofibromas are fairly common. It is well to remember that extrapulmonary masses, seen in the posterior chest in the lateral view and close to the middle in the postero-anterior view, may also be neurofibromas arising from the spinal nerve roots. Roundish densities in the cardiophrenic angle are apt to be lipomas or cysts.

The visualization of the bronchial tree by contrast media is a most valuable diagnostic aid. The material usually used is lipiodol and often 10 to 20 cc. will be sufficient to give satisfactory visualization. This may be instilled by direct vision through the bronchoscope, although most radiologists prefer to instill it indirectly through an intratracheal catheter with the patient lying on his side on a tilt fluoroscopic table. Thus by tilting the table during the fluoroscopic observation they control the inflow of lipiodol into the desired bronchi.

Some operators have instilled all five main lobe bronchi with lipiodol at one time. However, this may cause some respiratory embarrassment and for this reason it is usually advisable to visualize one lung, or the lower or upper halves of each lung, at one sitting and repeat the balance of the examination in three to five days. We would like to caution all physicians to be aware of the fact that many patients are being subjected to contrast media studies of their bronchial trees. Lipiodol may remain in the lungs or bronchial system for a long time. While it is apparently harmless it does give a peculiar X-ray picture. However, once you have familiarized yourself with the appearance of old lipiodol in a lung picture, you are not likely to mistake it for a disease. The picture is most confusing if you are not aware that it is lipiodol. It is well to ask the patient if he has had a bronchogram some time in the past.

The bronchogram is the only definite means we have of diagnosing bronchiectasis of the lung. The picture developed is one of bronchiolar widening, clubbing or terminal sacculation. Bronchiectasis is often secondary to a bronchiogenic carcinoma.

Bronchograms will often demonstrate a lung abscess as a large sac. This is true if the abscess communicates with a bronchus.

The bronchogram may demonstrate an occluded bronchus. This is always suspicious of a carcinoma. It is to be remembered that benign adenomas can also occlude a bronchus, also that the bronchus may appear occluded because it is filled with mucus which interferes with the inflow of lipiodol or it may appear occluded due to faulty technique in filling.

When the bronchogram shows a segmental narrowing or filling defect and this defect is near a bifurcation of a main or secondary bronchus, carcinoma may be strongly suspected.

Endoscopy-endoral. Since the introduction of the rigid tube which was inserted down into the esophagus and trachea there has been increasing use of this diagnostic means to obtain direct view of the major bronchi and to remove pieces of pathological tissue for biopsy examination.

Jackson[10] states that 76 per cent of bronchiogenic carcinomas can be visualized through the bronchoscope. While the appearance of the lesion through bronchoscopy may appear very characteristic of carcinoma, only by removal of a specimen for microscopic examination can the diagnosis be accepted with any certainty.

Certain information can be collected by visual examination through the bronchoscope:

1. The most important is the direct view of the lesion. If the base of the lesion or its infiltration into the bronchial wall can be seen, its measurement down the bronchus can be ascertained. Using the teeth as a measuring point we determine the distance to the carina and then measure the distance down to the tumor into the right or left bronchus. This gives us the distance between the tumor and the bifurcation of the trachea. It is usually necessary to have at least 1½ cm. distance between the tumor and the carina so that at surgery there will be sufficient room to resect far enough medial to the lesion to be certain that no tumor tissue is left in the resected stump and still leave enough stump for successful closure of the bronchus.[12] Cases have been reported in which the bronchus was resected flush with the trachea and the opening closed by drawing together the tracheal opening. However, it is to be remembered that if in this closure the trachea is narrowed to less than the lumen of the remaining bronchus, stenosis of the bronchus of the remaining lung will ensue.

We will not describe in detail, the appearance of the tumor in the bronchoscope. A much better idea of this can be obtained by reference to any of the colored pictures that appear in texts describing endoral endoscopy. Three types of lesion are encountered: (a) the infiltrative thickening of one wall of the bronchus; (b) the pailliferous mass often appearing as a small cauliflower or a wart-like structure. Occasionally the base by which it is attached to the bronchial wall may be seen and (c) the ulcerative lesion (usually with a raised, indurated margin).

The lesions are usually at or near the bifurcations of the main or primary bronchi to the lobes—those in the two upper lobe bronchi being more difficult to see.

2. Observation can be made as to the character of the bronchial mucosa and lumen. Thick edematous, pale, stretched mucosa, or irregularity of the lumen may indicate peribronchial infiltration or pressure from metastatic peribronchial nodes.

3. The flattening or spread of the carina may be indicative of extensive involvement of the hilar glands in a known case of bronchiogenic carcinoma.

Bronchoscopy may also reveal pus exuding from the bronchus of a bronchiectatic lobe or lung abscess and occasionally even the cavity of an abscess. These may be secondary sequelae of the tumor. Occasionally a bronchial fistula will be observed where the tumor has eroded through a bronchus. Esophagoscopy may reveal an erosion of the tumor through the esophagus.

There have been cases reported in which the bronchiogenic carcinoma has been completely and successfully removed through the bronchoscope. Yankauer reported a series of such cases.[21] This procedure is hardly to be recommended in the light of the advancement in thoracic surgery since the publication of this paper by Yankauer.

Jackson and Konzelmann have this to say on the technique of bronchoscopy: "After careful roentgenographic localization of the lesion in both planes, the bronchoscope is passed down to the suspected area and the bronchial orifices inspected. If fungating tissue is found, removal of an ample amount is easy. For this type of lesion we generally use a light 'ball' forceps. If the lesion is of the infiltrative type, it may be necessary to use a cutting tissue forceps. If there is no definite involvement of the bronchial wall, but only a compression or a bulge, biopsy should be postponed. One should exercise great care not to traumatize normal bronchial spurs, or bite too deeply. It is necessary to make certain to get tissue representative of the tumor and not just the peripheral inflammation." (We might interject here that, wherever possible, the biopsy should be taken from the base of the tumor stalk as the most likely place to show carcinomatous changes.) "It is very important that the presence or absence of distortion, fixity, and infiltration of the bronchial wall be noted. This is especially important when the histologic picture is inconclusive."

Bronchoscopy is not without danger. Deaths have been reported following its use and very severe hemorrhage is not infrequent.

Other Diagnostic Methods.

Occasionally a biopsy of an enlarged gland from the axilla or clavicular region in a suspected case of bronchiogenic carcinoma will give positive evidence of metastasis of the disease and demonstrate the inoperability of the case.

While we have not been able to find any reports in the literature on the use of the thoracoscope as a diagnostic aid, we were prompted to use it in one case. We were not successful, as a satisfactory pneumothorax could not be established. A satisfactory pneumothorax is a prerequisite to successful thoracoscopy. By the use of a cystoscope-like inspecting tube, the inside of the pleural cavity can be inspected. It should be possible to visualize peripheral lesions and pleural implants by this means.

As we develop refinements in diagnostic methods and apparatus, we must not forget a most fundamental diagnostic procedure: exploratory thoracotomy. This serves two purposes: that of diagnosing the lesion and evaluating the degree of metastasis and spread; the definitive surgical removal can be undertaken without further delay.

Diagnosis

Diagnosis is dependent on the use of all the factors and methods already mentioned. It is well to remember that the diagnosis may be reasonably suspected from the history. Physical findings may be assumed from all the X-ray evidence, and is proved by histologic recognition of tumor cells in biopsy material.

It is to be pointed out that the disease must be differentiated from Hodgkin's disease, lymphosarcoma, metastatic carcinoma of the lung, tuberculosis, bronchiectasis, lung abscess, pleural effusion (especially encapsulated effusions), unresolved pneumonias, atelectasis, and benign adenomas. These are the main conditions which will require careful analysis and differentiation.

Even histological study may not be definitive. Many conditions may give bizarre hyperplasias of the mucosa of the bronchial tree, influenza being a common one. Influenza is responsible for such peculiar metaplasias of the bronchial mucosa that some investigators at one time believed it may have been responsible for the increase in this disease. However, there has been no correlation between epidemics of influenza and the incidence of bronchiogenic carcinoma. Often the pathologist will be evasive in his report and as often he will report negative results which must not be assumed to rule out the diagnosis. In the final analysis, the diagnostic acumen and the clinical judgment of the surgeon must be the deciding factors in the diagnosis.

Prognosis

In general it must be said the prognosis is very unfavorable. Because of this, the boldest type of surgery is excusable. In general, it may also be said that the small, round or spindle cell type is most malignant, the adenocarcinomatous type next, and the squamous cell type least. Also, the younger the patient, the more rapid progress of the disease; the older, the slower in its development.

Tuttle and Womack [20] state that the closer the origin of the tumor to a large bronchus, the earlier symptoms develop and the slower the condition spreads. They give as the average duration in the unoperated case as eight months for the hilar type and five months for the peripheral type. Graham, Singer and Ballon [6] state that a patient with bronchiogenic carcinoma of a primary bronchus will live four times as long as one with peripheral involvement. All of these estimates concern the time after the onset of symptoms as obtained from the history. No one can state how long the disease may have been present without production of any symptoms. Cases have been reported alive seven years after positive microscopic diagnosis of the disease.[17] Most authorities agree that patients with this disease will live less than two years.

One fact must be remembered; death from bronchiogenic carcinoma is not due to the primary tumor, but is usually due to the metastasis or extension of the disease to other structures. Bronchiogenic carcinoma may produce a Cor Pulmonale and death may be due to right heart failure.

Treatment

Except for the relief of secondary complications medical treatment has nothing to offer these patients. The treatment is therefore limited to two other therapeutic methods:

1. *Irradiation therapy by X-ray or radium*

There is a most voluminous literature covering this phase of the subject. A review of the literature is not within the scope of this presentation. The evaluation of the efficacy of this treatment is not settled. Even among practicing irradiation therapists there is no unanimity of opinion. Dr. Cutler of Chicago [22] is of the opinion that in bronchiogenic carcinoma there is little to be gained by this treatment in the prolongation of life, and the lung fibrosis that develops is apt to make the patient feel much worse.

Some radiologists feel, however, that while cure is not often attainable by this method, improvement does ensue. In 1932 Vinson reported results of treatment on 71 patients and stated that while results were far from brilliant, nevertheless, in 10 he felt there was either an improvement or cure and this justified the continued use of this mode of treatment.

Some surgeons have laid down the dictum that irradiation therapy should be employed in all inoperable cases Graham [6] states that there is no record of a proven case of bronchiogenic carcinoma treated by irradiation which has a five year record of survival and non-recurrence. He concludes that the only treatment that can offer any hope is radical surgical removal of the tumor and surrounding tissue.

2. *Surgery*

Churchill [3] states "that unless definitive evidence of metastasis or inoperable extension of the growth is at hand, every patient with a primary carcinoma of the lung should be subjected to open thoracotomy to determine whether the growth can be resected."

Most surgeons insist on complete pneumonectomy as the only course offering the hope of cure. Lobectomy is reserved for those cases in which cure does not seem probable and is undertaken for palliation rather than cure. It may be of value in the relief of an associated lung abscess of bronchiectasis.

Of historical interest is the fact that the first successful pneumonectomy in this country for bronchiogenic carcinoma was in 1934 by Evarts A. Graham.[6] It will be seen from this that the surgical attack on bronchiogenic carcinoma is but a recent innovation. Even today the technique of the procedure is undergoing revision and crystallization. Of all the surgical specialties, thoracic surgery is the baby, but it has shown a most precocious development. It is, therefore, not surprising to note that relatively recent statistical reports on the mortality of pneumonecomy have run as high as 60 per cent.[14] This has steadily reduced until the reports of the past few years reveal mortality figures for this type of operation from 8 per cent to 30 per cent. It is believed that these figures will show even more improvement in the near future. In spite of this risk, however, there is no other course for these patients but to accept surgery, for without surgery they are doomed.

It is still too early to have accumulated large series of cases followed for long periods. However, reports of 5 and 7 year cures are becoming more and more common.

PREOPERATIVE PREPARATION

Preoperative preparation is of utmost importance. Many of these patients may have lost considerable weight. Rebuilding the general weight and particularly the protein reserve of these patients is important. The surgical staff at the University of Minnesota have adopted a rule of thumb in preparation of patients for gastric resection which has been equally applicable to patients for pneumonectomy. They estimate that a patient needs about one week of preparation for every 10 per cent loss in body weight exclusive of edema or effusion loss. Thus a patient with 20 per cent loss of weight requires two weeks of preoperative preparation. During this period the patient is placed on a Varco diet. This is a diet high in protein and low in fat which is not too expensive to prepare and is satisfactorily tolerated by the average patient. It contains all of the necessary vitamins and is computed to supply about one and one-half calories per cubic centimeter. Patients can easily consume 3000 cc. of this mixture by mouth either in divided feedings every two to three hours or by constant gastric drip.

Many patients with bronchiogenic carcinoma have an associated anemia. Also because the surgery will remove a highly vascular bed, it is advisable to give the patient blood transfusions for one to two days before surgery.

Vital capacity measurements are important preoperatively. It is to be remembered that one-half the lung tissue will be removed and while this may not necessarily reduce the vital capacity by half, as the diseased portion of lung is not taking part in the oxygen exchange, nevertheless it is well to be fairly certain there will be sufficient capacity left to enable the patient to carry on a fairly normal existence following surgery.

In many cases, a great deal of secondary lung infection is present. Because of this, and also to reduce the normal bacterial flora of the bronchial tree, a regular course of aerosol penicillin therapy is of great value. In a fine mist nebulizer 1 cc. of 20,000 unit penicillin is used and the patient inhales this spray for one minute every hour for at least two days preoperatively. Added to this, if secretions and pus are present, postural drainage is valuable.

It is important to have an adequate supply of blood for transfusions during surgery. The average uncomplicated pneumonectomy will need at least 1500 cc. of blood to replace blood and fluid loss during the operation. Should an emergency develop during the operation, the surgeon is spared no end of anxiety by having a large canula already in an adequate vein hooked up to an infusion apparatus by which he can give very large quantities of blood.

The choice of anesthesia is important, but the choice of anesthetist is even more important. The anesthesia should be given by intratracheal tube through which the anesthetist can maintain positive pressure breathing for the patient whenever, and for as long as, the surgeon requires. We have found cyclopropane most satisfactory as an anesthetic agent. This agent allows the use of a high concentration of oxygen throughout the operation.

POSTOPERATIVE CARE

We have omitted the technical descriptions of both pneumonectomy and lobectomy. These various techniques can be reviewed in texts on chest surgery. It is of value, however, to review some of the important considerations in the immediate postoperative care.

In cases of pneumonectomy the postoperative wound is closed tight. This leaves a large hollow pleural cavity filled with air. The space is rapidly filled with transudate fluid. If this fluid develops too rapidly, the enclosed air may not have time to be absorbed. This results in a condition comparable with a tension pneumothorax. It is imperative to be on the alert for this possibility and relieve this tension by the insertion of a needle, before shift of the mediastinum and cardiac embarrassment ensues. Dr. Harper of our staff has suggested the procedure of leaving a needle or fine catheter attached with a flutter valve in the chest cavity to obviate the development of increased tension. The suggestion has good rationale behind it. An objection may be raised, however, that while it would allow for the escape of excess air without inflow of air, it may also allow the escape of the fluid which is essential for the eventual obliteration of the cavity and thus create an actual negative pressure with symptoms as annoying as a tension pneumothorax.

In cases in which lobectomy is performed it is essential to maintain constant negative pressure to aid the expansion of the remaining lobe or lobes. To accomplish this, one or more catheters are left draining the operative wound through an intercostal space and these catheters are connected to a constant negative pressure pump which mainatins a negative pressure of 10 to 20 cm. of water. These tubes usually can be removed on the third or fourth postoperative day.

The immediate postoperative condition should be checked with frequent X-rays of the chest to be sure the remaining lung and lobes are functioning properly. If there is any suspicion of atelectasis, the patient should be bronchoscoped promptly to remove obstructive mucus plugs from the bronchi to the remaining lung tissue. The administration of oxygen is often necessary in the postoperative period, to maintain proper oxygen saturation of the blood. This can be satisfactorily administered by a well functioning oxygen tent which has the added advantage of being able to control the temperature of the inhaled gases.

Infection of the operative cavity is a dangerous potential complication. This is best avoided by immediate prophylactic use of the bacteriostatic agents; penicillin is easiest to handle for this purpose. Approximately 100,000 units of penicillin are given intramuscularly in divided doses every two or three hours throughout the 24 hours of the day. This should be maintained for five days to one week.

Blood transfusions postoperatively may occasionally be necessary, especially where there has been considerable loss of blood during the operative procedure. However, great care should be exercised in the administration of any intravenous fluids as a considerable portion of the pulmonary capillary bed has already been removed, and the pulmonary circulation may not be able to cope with great increase in blood volume. Excessive intravenous fluids may precipitate a pulmonary edema which, in a patient with a recently abruptly reduced vital capacity, may prove fatal.

Since there is not much strain on thoracic wounds, these patients may be encouraged to hyperventilate themselves and move about freely and early. They should be encouraged to sit up and get out of bed as soon as possible. They should also be encouraged to cough. This can often be facilitated by having the nurse exert firm pressure over the wound area with the flat of her hand.

It is rarely if ever necessary to do a thoracoplasty to obliterate the postoperative cavity even when this cavity becomes infected. When empyema does result it must be drained like any accumulation of pus. In these cases it will often require drainage over prolonged periods. Attention should be called to the fact that the postoperative bronchial stump can blow out at any time postoperatively, even as late as the third week.[12]

Summary and Conclusions

1. Bronchiogenic carcinoma is a disease which is on the increase. Alton Ochsner [14] states that next to carcinoma of the stomach, bronchiogenic carcinoma is the most common cancer in men. This increase in incidence has been reported from all sections of the country and all countries of the world.

2. There is no known etiology. Heredity may play a small role. It is three to four times more common in males. It can occur at all ages; the usual ages, however, are between 40 and 60.

3. Hsitologically, three types are recognized: (a) round cell or spindle cell, the most undifferentiated and probably the most malignant, (b) adenocarcinomatous and (c) squamous cell.

4. Anatomically, the tumors may be classified as hilar or peripheral. About 20 per cent of all cases are peripheral.

5. Metastasis is common and may occur in all tissues and organs of the body. The most common lymphatic spread is to the peribronchial and mediastinal nodes. Spread by the vascular route is commonly to the brain, liver, adrenals, and kidneys.

6. Symptoms and signs are often meager; the most common being cough, fatigue, bloody sputum, dyspnea, and pain in the chest.

7. X-ray examination is important and should include views in at least two planes besides bronchograms and planographic studies.

8. In about 75 per cent of the cases, the lesion can be seen through the bronchoscope and a biopsy obtained for histological study.

9. Treatment should be surgical as early as possible. Prolonged clinical study should be avoided as it may postpone surgery beyond the period of operability. When in doubt, thoracotomy should be considered a most valuable diagnostic procedure.

10. Irradiation therapy offers little hope of cure and is of doubtful palliative value.

11. The best hope of cure lies in total excision of the tumor and its surrounding tissue. For this reason, pneumonectomy is the operation of choice.

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. . . MEET OUR CONTRIBUTORS . . .

J. A. Myers, M.D., of Minneapolis, editor of this issue, flew to Lima, Peru, on March 15 with a delegation of tuberculosis leaders from the States to take part in the program of the Pan-American Congress on Tuberculosis.

Kendall Emerson, M.D., Managing Director of the National Tuberculosis Association, is well-known nationally for his work in the field of tuberculosis.

W. J. Bryan, M.D., Rockford, Illinois, has been Superintendent and Medical Director of the Rockford Municipal Tuberculosis Sanitarium for 10 years; President, Illinois Tuberculosis Association; President, Winnebago County Medical Society; President, Mississippi Valley Trudeau Society; Fellow, A.M.A., American College of Chest Physicians, American College of Physicians, Member, National Tuberculosis Association.

A. A. Pleyte, M.D., Milwaukee, Wisconsin, is President of the Wisconsin Trudeau Society; Fellow, American Public Health Association; member of committees on chest diseases, Wisconsin Medical Society and Milwaukee County Medical Society; member, A.M.A., American College of Physicians, American Trudeau Society, and Mississippi Valley Trudeau Society.

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Richard E. Ebert, M.D., Chief of Medicine, Minneapolis Veterans Administration Hospital, was a contributor to the March, 1947 issue of Journal-Lancet.

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Henry E. Michelson, M.D., has been Professor of Dermatology and Syphilology and Director of the Division, University of Minnesota, since 1933; studied in Vienna and Paris and is corresponding member of the French Dermatological Society and the Austrian Dermatological Society; member of the American Dermatological Society, Chicago Dermatological Society, and local societies.

Edward Mandell, M.D., has been with the Minneapolis Veterans Administration Hospital since 1942; from 1930-42 was Adjunct Surgeon of the Bronx Hospital, New York City; specializes in thoracic surgery; member, American College of Chest Physicians, Minnesota Trudeau Society, and A.M.A.

The JOURNAL LANCET

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Great Northern Railway Surgeons' Association
Minneapolis Academy of Medicine
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North Dakota Society of Obstetrics and Gynecology
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Editorials

HOSPITALS HAVE POST-WAR PROBLEMS

Among the many far-reaching consequences of the war period, those which had their effect on community hospitals appear to have continued into this post-war period as chronic conditions.

The first such post-war problem is the lack of hospital accommodations to adequately serve community needs. This condition is nation-wide and is a result of many factors. Basically, the shortage of hospital beds exists for the same reason that there are not enough houses, apartments, offices, schools and other facilities. Through the many years of depression and then during the war period, construction was deferred and there were not enough additions to hospital facilities to take care of the normal increase in population. An even more important factor has been the education of the members of the community to the increased use of hospitals. New and improved methods of patient care have been developed which can better be administered in the hospitals. Therefore, physicians have directed more and more of their patients to these institutions. There is also the spectacular growth in prepaid hospitalization plans led by the Blue Cross which in a few years has grown so rapidly that at the present time more than 24,000,000 people in the country are sharing in its benefits—and utilizing every available hospital space.

The obvious solution to the shortage of hospital beds is the building of more hospitals. A recent survey has shown that 195,000 additional beds are needed within the next few years. But post-war shortages of building materials and equipment together with sky-rocketing construction costs are resulting in the postponement of many such projects.

At the same time that hospitals have been filled to overflowing and an imperative need for additional beds has become evident, the second major problem of hospitals has developed to make conditions doubly difficult. This, of course, is the insufficiency of nursing personnel to meet present-day demands for nursing service in hospitals. This much-advertised shortage is repeatedly voiced in the question "Where is that nurse?" The answer is clear when these facts are considered: (1) As a result of the war, thousands of nurses are required to care for sick and injured veterans in government hospitals; (2) Admissions to hospitals increased from 10,000,000 in 1940 to over 16,000,000 in 1945, an increase of more than 60 per cent in five years; (3) Working hours of nurses have decreased steadily, while vacations, sick-leaves and holidays have been increased, and, therefore, it takes more nurses now to care for the same number of patients than it did only a few years ago.

The solution to this problem lies in a more active program of recruitment of student nurses and the development of trained workers to take over the many not strictly professional duties now performed by graduate nurses. The nursing profession itself has painted such a black picture of nursing that it is not surprising that recruits have not been secured in larger numbers. It is time that some of the present-day advantages of a nursing career be made known to young women.

Commenting on the need for improved medical staff organization in hospitals, a leading medical authority recently said, "It is not going to be long before the medical profession and hospital administrators will be faced with a terrific dilemma in the problem of policing their medical staffs versus freedom of licensed physicians to use hospital facilities. As medical practice becomes more and more concentrated in hospitals and as administrators and governing boards awaken to their full responsibility to patients, it is apparent that staff and administration cannot operate independently of each other. In the well run hospital, they must work together to establish policies and maintain control of medical quality." This excerpt from a recent editorial in *The Modern Hospital* points out another important post-war problem with which hospitals must cope.

In the past three or four years hospitals have faced a rise in costs of operation which is unprecedented both as to its rapid development and its severity. For a considerable time, income resulting from abnormally high occupancy of hospital beds was sufficient to obscure the steady rise in costs. This increased volume was sufficient to offset increasing expenses without advancing the rates of charge to patients. Later on, however, as costs mounted, charges to patients had to be increased accordingly. High incomes, a minimum of unemployment and participation in prepaid hospitalization plans, in general, made it possible for the public to accept such higher charges for hospital service. In the latter part of 1946, however, expenses caught up with, and very often exceeded income, and the upward trend still continues. On the average, costs have increased more than 50 per cent in the past three or four years and the end is not yet in sight. Hospitals are faced with the serious problem of securing the needed income to meet this condition and there is a serious question of how much more the public will be able and willing to pay.

It is evident from the foregoing outline of some of their more important problems that the managers of hospitals together with their medical staffs have a job cut out for them. This is a transition period in the history of these institutions. Inefficient, loosely-run hospitals were perhaps able to survive pre-war conditions, but it will require the utmost in efficient, economical and capable management to meet the problems of today and to permit our hospitals to maintain their rightful place in the service of their communities.

A.E.H.

THE MINNEAPOLIS CHEST SURVEY

In 1940, the Committee on Tuberculosis of the Minnesota State Medical Association instituted a statewide tuberculosis control program and subsequently outlined certain procedures which might be conducted by county medical societies in collaboration with other organizations interested in tuberculosis control. Committees on Tuberculosis were appointed in all of the county societies. Already in several counties the medical societies have assumed the responsibility for tuberculosis control and first class programs and surveys are in operation.

In Hennepin County the Society's Committee on Public Health, with Dr. Charles E. Merkert as Chairman, is charged with the tuberculosis control activities. A citywide chest survey was proposed in 1940 by the late Chester Stewart and his co-workers. Since that time it has been discussed by physicians on numerous occasions. Heretofore the main obstacle was lack of equipment and adequate funds for personnel. It was not until members of the State Committee on Tuberculosis conferred with Dr. H. E. Hilleboe, Director of the Tuberculosis Division of the United States Public Health Service, that the solution of the problem seemed near. Dr. Hilleboe looked favorably upon this project. Dr. Merkert then procured the unanimous approval of the County Medical Society which, in turn, requested the assistance of the Tuberculosis Division of the United States Public Health Service. Dr. Merkert's committee invited other organizations to participate, such as the Division of Public Health and the County Tuberculosis Society.

This is another manifestation of the splendid spirit toward disease control which has been in evidence on several previous occasions by the Hennepin County Medical Society. The physicians of this county have exhibited willingness to devote a tremendous amount of time and effort to the project without financial remuneration.

When the survey begins in May, 1947, portable photofluorographic units and personnel provided by the United States Public Health Service will be moved from place to place about the city so that one will be available not more than four blocks from any home. A 70x70 millimeter photofluorogram will be offered to every citizen over 15 years of age without any expense to the individual. No diagnoses will be made from X-ray shadows, but persons presenting chest lesions that seem significant will be referred to the physicians of their choice for all phases of the examination necessary to make accurate diagnoses. Individuals unable or unwilling to pay for such service will be eligible to free clinics. Those found to have active tuberculosis will be treated by the physicians of their choice or referred to hospitals and sanatoriums. The success of this survey will depend largely upon the response of the public. This should be good, not only because of the tremendous amount of preparation that is being made, but also because chest surveys are not new in Minneapolis. The first one was offered to high school students here in 1922, and a thoroughgoing survey was conducted on a compulsory basis among the 3,600 employees of the schools in 1934. Excellent chest inventories have been made on large numbers of special groups, such as the aged and pregnant women. Moreover, approximately 2,000 persons have been surveyed annually by the Health Department since 1921. The University of Minnesota has conducted chest surveys of several thousand entering students each year since 1928. Recently the Hennepin County Tuberculosis Society conducted several photofluorographic surveys in the schools and in a few industries.

The main object of the present survey is to ferret out unsuspected contagious cases of tuberculosis in order that they may be treated promptly and their communities protected against contagion. Obviously other pulmonary conditions will be found, such as pneumonia, bronchiectasis, abscess and malignancy, in addition to pleurisy and abnormalities of the mediastinum, including some heart conditions.

There is nothing more deadening to a survey than slipshod and short-cut methods leading to diagnoses which later are repudiated. Therefore, careful differential diagnostic work is of extreme importance. The steps necessary for accurate diagnosis in chest diseases have been presented in an excellent article by Hilleboe, under the title, "Guide for Disposition of Persons with Abnormal Pulmonary Findings on X-ray Films." Each member of the Hennepin County Medical Society will receive a copy of this paper, and it will be reprinted in the June issue of the Journal-Lancet, which will be devoted to articles pertinent to the survey.

The Minneapolis survey is the largest of its kind that has ever been undertaken by a medical society assisted by the United States Public Health Service. Therefore, its success is of extreme importance to the reputation of the County Medical Society, all organizations concerned and the citizenry at large. The Hennepin County Medical Society and its allies have an opportunity to set the pace for other cities in a nationwide campaign in tuberculosis eradication which is being outlined and prosecuted by the United States Public Health Service.

J. A. M.

American Student Health Association

ANNUAL MEETING, NEW YORK, MAY 7, 1947
in conjunction with
Third National Conference on Health in Colleges May 7-10

NEWS LETTER

Thomas D. Fitzgerald, M.D., now at the Student Health Service at the University of Michigan, has been employed as Director of Student Health at Illinois State Normal University, Normal, Illinois, and assumed his duties on March 15th.

Because of illness in his family, W. H. Christian, M.D., has resigned as Director of the Student Health Service at Stephens College, Columbia, Missouri. Karl Cline, M.D., is the new Director.

Karl R. Beutner, M.D., 4646 Hazel Avenue, Philadelphia 43, Pennsylvania, wishes to enter the field of student health.

Reid B. Brader, M.D., 254 East Main Street, Nanticoke, Pennsylvania, who has been associated with W. H. York, M.D., at Princeton University, is looking for an opening in the field of student health.

E. J. Radcliffe, M.D., returned from the service in October, 1945, and resumed his duties as head of the Department of Student Health at Massachusetts State College, Amherst, Massachusetts.

STUDENT HEALTH PRACTICES*

The Medical Inspection

The greatly increased enrollment in our colleges and often a smaller staff, has forced many health service directors to abandon the entrance physical examination or to give it so inadequately that it loses its educational value.

To abandon the examination threatens the health of the whole college group. A large gathering of people coming from many backgrounds and places, is certain to have individuals who have communicable conditions.

In some colleges, this situation is met by a medical inspection of all students entering the school or returning after an absence of a semester or more. This procedure catches most of the acute infectious conditions, including trench mouth and the fungus infections present in many of the returning veterans. Especially if the medical history is obtained beforehand, this inspection may easily pick out those with war disability or other conditions requiring modified programs of activity or early conferences and examinations.

It is not difficult to organize the staff to use this occasion also to give diagnostic tests such as the tuberculin test, the Schick test or preventive inoculations such as influenza vaccine.

If this inspection is done at the Health Service, the student is made acquainted with the service available to him and the personnel responsible for it.

Student Hospital

The practices in a student hospital are based on a fundamental condition. It is that this type of hospital is a Department in an educational institution. That implies that such a place has an educational as well as a service function. On the basis of this implication, a student hospital might be considered a laboratory of health promotion.

In this laboratory, the following health principles may be demonstrated:

1. The early segregation of possible communicable diseases. Students should be encouraged to respect the rights of their roommates to health protection by going to the student hospital at once if they are developing a sore throat, if they have a chill, a fever or tender glands or a cold, even if it is after the regular dispensary hours.

2. The early attention to sudden aches and pains. No matter what time of day or night, the student knows he can get advice at the student hospital. If he is away from home, his parents are not available to advise him. Dormitory deans and housemothers are not trained for this service and should not assume advisory responsibility except to refer the student to the student hospital.

3. The value of rest. College life for many students is a strenuous competitive enterprise, filled with difficult adjustments. A tired or nervous student, perhaps worried or confused by some problem, unable to sleep, should be welcome at the student hospital for a period of rest, and for an understanding of his or her problem.

This availability of the student hospital attempts to discourage self-diagnosis, self-medication in an immature group. It stimulates and makes it easy for the development of a sense of responsibility for protecting the health of others. Parents are grateful in learning that their sons and daughters away from home have medical advice always available.

This concept of the student hospital as a teaching laboratory also requires the doctor and nurse to demonstrate the best professional practices.

Perhaps even in large universities with accredited general hospitals available, there may be a need for this type of student hospital, especially for those young people who are away from home. G. B.

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*The American Student Health Association assumes no responsibility for the opinions expressed or conclusions drawn by the authors.

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New Series

The Epidemiology of Streptococcal Infections

Francis F. Schwentker, M.D.*
Baltimore, Maryland

For many years the study of the epidemiological aspects of streptococcal infections was hampered because it was impossible to differentiate one strain from another. In later years, however, certain significant discoveries have permitted a classification of streptococci into antigenically different strains. Thus, hemolytic streptococci are divided into at least nine different groups on the basis of serological reactions to a carbohydrate fraction of the organism. These are labeled Groups A, B, C, D, E, F, G, H and K. Of these groups, Group A is the most important because, with few exceptions, all streptococci pathogenic to man fall into Group A.

Group A streptococci are further subdivided into at least 40 different types, numbered Types 1, 2, 3, 4, etc. This is done on the basis of a serological reaction against a protein fraction of the organism. Although there are actually two different tests for this purpose, one, the Griffiths agglutination reaction and the other the Lancefield precipitin test, the latter is the more specific and all of our later work has been done with this test.

The epidemiology of streptococcal infections involves a host-parasite relationship. Investigations must therefore include a study of the host population itself as well as the environment in which the population group lives. The streptococcus is part of the environment.

Let us first consider the environment. The striking observation here is that streptococcal infections have an extremely low morbidity in tropical climates and are most common farther north. This is demonstrated in Fig. 1 for scarlet fever.[1] Here the average morbidity over a 10-year period for each country or section of a country is plotted against the mean latitude. It is evident that scarlet fever is practically non-existent in the earth's band lying between latitudes 20° North and 10° South. But on each side of this band the incidence increases rapidly to reach a peak in the colder climates. This same relationship also holds for other types of streptococcal infections. Even within a given area, we have seasonal fluctuations of incidence. Scarlet fever, for example, has a high incidence in winter and early spring and is rarely seen in summer months. Many explanations for this difference in the geographical and seasonal distribution of streptococcal infections suggest themselves; the mean weather temperature, amount of sunlight, living indoors versus outdoors, but none of them has yet been proven valid.

Of most interest to us in our study of the environment has been the streptococcus itself. Our first investigations were aimed at determining whether any given type or types of streptococci were responsible for scarlet fever or other streptococcal infections. Strains of streptococci were collected from cases of scarlet fever in 22 different countries and typed.[1] We found that in each country several different types were responsible for disease but that these types varied from country to country. When a large enough sample was taken, however, as in Rou-

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*From the Harriet Lane Home, The Johns Hopkins Hospital, and the Department of Pediatrics, The Johns Hopkins University School of Medicine.

TABLE 1

Serologic types of Hemolytic Streptococcus at Naval Training Stations

Type	Bain-bridge	Farragut	Great Lakes	Sampson	Other Activities	Total
1	87	108	54	11	34	294
2	4	0	2	3	3	12
3	26	61	72	48	28	235
4	0	2	1	2	0	5
5	28	4	94	29	6	161
6	28	22	23	30	18	121
8	0	1	0	1	3	5
9	0	3	1	1	0	5
11	0	0	0	2	0	2
12	27	7	12	34	10	90
13	1	0	1	3	1	6
14	5	22	0	4	23	54
15	0	0	0	0	0	0
17	69	305	95	26	93	588
18	85	10	1	4	4	104
19	392	342	78	15	128	955
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	36	25	6	12	6	85
26	0	0	7	7	4	18
28	4	4	0	2	2	12
29	6	0	0	2	0	8
30	30	1	3	21	12	67
31	0	0	0	0	0	0
32	0	0	3	2	0	5
33	2	2	1	2	0	7
36	4	20	6	2	16	48
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	0	0	3	2	0	5
40	0	0	0	0	0	0
41	3	2	2	9	1	17
42	0	0	0	0	0	0
43	2	0	1	2	0	5
44	2	2	1	3	1	9
46	1	0	1	0	2	4
?	134	111	64	168	87	564
Not group A	258	135	104	394	178	1,069
Total	1,234	1,189	636	841	660	4,560

mania where we were working, every single type was recovered at least once. Even within the United States the predominant pathogenic types differ in various localities, but almost all types are found everywhere. Table 1, taken from work done at various Naval training stations[2] illustrates this point. At Bainbridge, Maryland, for instance, Type 19 was outstandingly the greatest disease producer, although several other types were also active. At Farragut, Idaho, Types 17 and 19 were almost equal in pathogenicity, while at Sampson, New York, Types 3 and 12 were foremost, yet not much ahead of the others.

Thus it is evident that at any given time, in any locality, many different types of streptococci may be responsible for producing illness but that a few types will predominate over all others. This situation is not static, however. Table 2 shows the types of streptococci causing scarlet fever in Roumania by six-month periods for four years.[1] Type 1, which was responsible for only an occasional case prior to July, 1936, became very active and in the last half of 1939 caused 23 per cent of the scarlet fever. Type 10 had an unvaried career and was consistently responsible for about half the scarlet fever over the entire four-year period. Type 27, on the other hand, lost its pathogenic activity and from causing 36 per cent of the illnesses in 1936 fell to less than one per cent by the end of 1939.

Thus all three possibilities are illustrated. A particular strain or type of streptococcus may hold its pathogenic ability for many years or it may lose it or it may gain this ability.

At times, this change may be quite rapid. Table 3, tabulating our experiences at the U. S. Naval Training Station at Bainbridge, shows that from one season to the next, Types 3 and 6 practically disappeared as a cause of streptococcal disease, Type 19 held its own or increased, and two new types, 17 and 18, were either introduced or became active.

There is still another interesting characteristic of the streptococcus which we learned from this work. If, on the basis of whether a particular type causes a high or low percentage of the total illness, we give it a rating of 1, 2, 3 or 4 plus as shown in Table 3, and if we give it a similar rating for its ability to produce typical scarlet fever with rash, we find that some organisms, Types 3 and 19 for instance, are capable of causing scarlet fever and streptococcus tonsillitis as well. Type 6, however, which caused half the tonsillitis without rash in the 1942-43 season, was not once implicated in a case of scarlet fever with rash during the same period. Type 1 was apparently a somewhat similar organism; it caused tonsillitis out of all proportion to its ability to produce scarlet fever.

Why any streptococcus should be highly pathogenic and yet apparently have little or no ability to produce the scarlet fever picture, we cannot say. The obvious answer would be that it lacks ability to produce the specific erythrogenic toxin. The limited number of tests we have done, however, indicates that this is not the case. Type 6, which caused no scarlet fever, produced quantitatively just as much toxin in the test tube as did the highly scarlatinogenic strain, Type 3. Perhaps there are some qualitative differences not apparent in the present crude tests.

It seems, therefore, that the various strains or types of streptococci have definite individualities. Some are

TABLE 2

The Percentage Distribution of Serological types Among Scarlatinal Streptococci Recovered in Successive 6-Month Periods in Roumania

Type	Jan. to June 1936	July to Dec. 1936	Jan. to June 1937	July to Dec. 1937	Jan. to June 1938	July to Dec. 1938	Jan. to June 1939	July to Dec. 1939	Total
1	3	3	1	*	*	6	17	23	7.0
2	. .	*	1	*	*	. .	. .	*	0.4
3	6	3	6	3	5	1	3	2	3.1
4	. .	1	1	1		*	*	*	0.7
5	2	*	. .		*	*	. .	. .	0.4
6	5	7	8	4	1	3	*	2	3.8
8	. .	*	*	1	*	*	*	. .	0.5
9	. .	*	2	1	. .	. .	.	. .	0.5
10	51	43	54	55	69	68	53	50	56.2
11	1		*	1	1	*	*	1	0.6
12	. .	*	*	*	*	*	2	2	0.8
13	. .	*	*	*	1	1	3	3	1.2
14	. .	.		*	1	*		*	0.2
15	.	*		*	.		*	. .	0.1
17	. .	. .	*	*	1	*	. .	. .	0.4
18	.	. .	*	*		*	. .	*	0.4
19	.		. .	. .	*	. .	. .	. .	0.4
22	2	*	.	.	. .	. .	. .	. .	0.2
23	. .		*	*	1	1	. .	. .	0.5
24		*		.	. .	. .	. .	. .	0.1
25		. .		*	1	.	. .	. .	0.2
26	.	.	*	. .	. .	*	*	.	0.1
27	28	36	22	23	8	3	2	*	14.0
28	. .	*		.	.	. .	. .	.	0.1
29	. .		*	.	. .	.	.	*	0.1
Not typed	.	*	*	2	4	10	10	11	5.7
Group C	1	*	.	2	1	*	2	*	1.0
Group G	. .	*	.	*	*	1	2	. .	0.7
Not group ACG	.	. .		*	. .	1	4	*	0.9
Total number	96	469	303	368	269	631	374	322	2,832

*Less than 1.

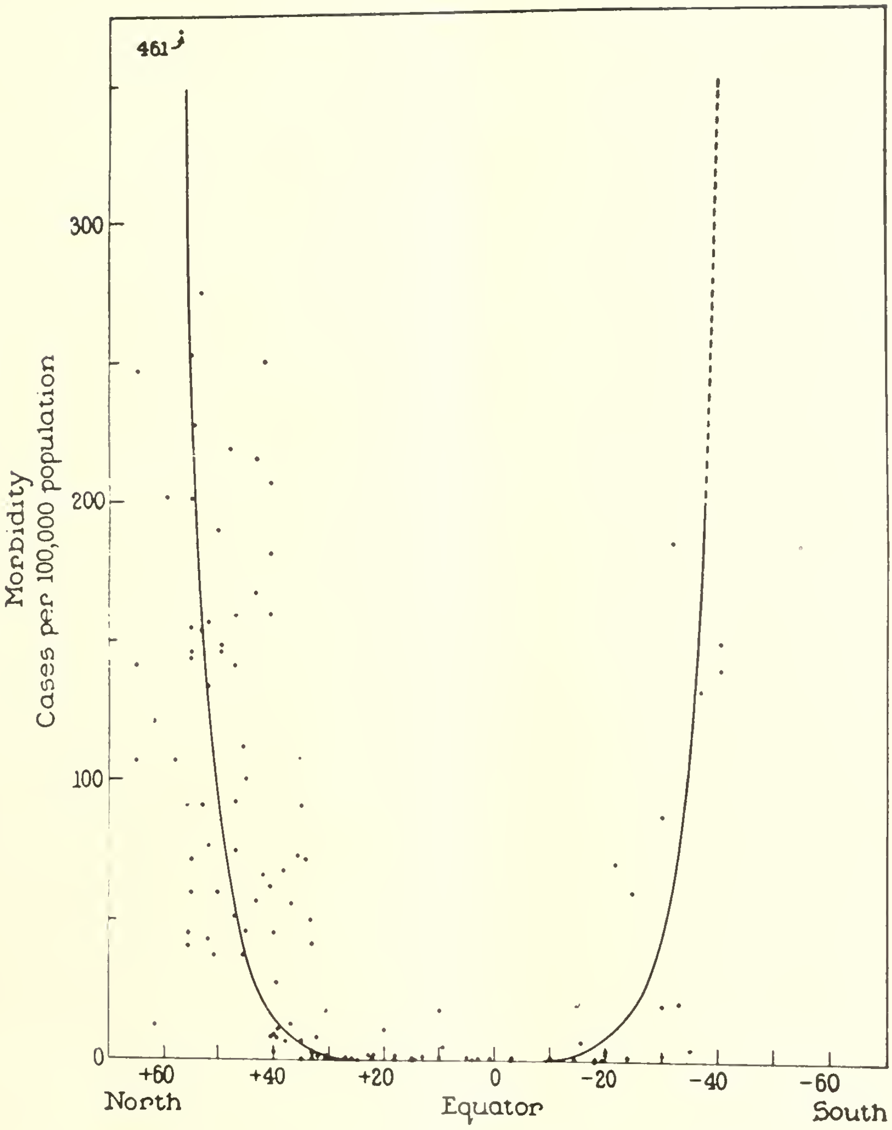

Fig. 1. The relation of scarlet fever morbidity in various countries to the mean latitude of the country. From Schwentker, et al.[1]

Table 3
Percentage of Illness Caused by Various Types of Streptococci

	Tonsillitis without Rash		Scarlet Fever		Organism	
Type	1942-43	1943-44	1942-43	1943-44	Infectivity	SF Ability
1	21%	18%	5%	8%	**	*
3	10	0	58	4	*	****
6	50	0	0	0	****	0
12	7	0	0	0	*	0
17	0	14	0	14	*	*
18	0	10	0	8	*	*
19	10	52	35	41	**	****
30	0	0	0	9		
Other	2	6	2	16	...	...

highly pathogenic; others have little or no ability to produce disease. Among pathogenic types, some are good producers of scarlet fever; others seem to lack this ability regardless of how pathogenic they may otherwise be. Each of these characteristics may vary from year to year so that the streptococcal picture in any locality is a constantly changing one.

What, then, causes a particular type suddenly to develop the ability to disseminate itself throughout the population and cause illnesses? This all-important question cannot yet be answered. However, the data thus far presented have shown that it is apparently an individual characteristic of the strain and not a factor of the environment. Fig. 2 illustrates this point schematically. During the war endemic scarlet fever due to three or four different types was running its usual course at Fort Warren at Cheyenne, Wyoming, when a definite outbreak suddenly began. After the streptococci from all the cases had been typed it was learned that there had been no change in the number of cases due to the usual endemic types. Actually endemic scarlet fever had run

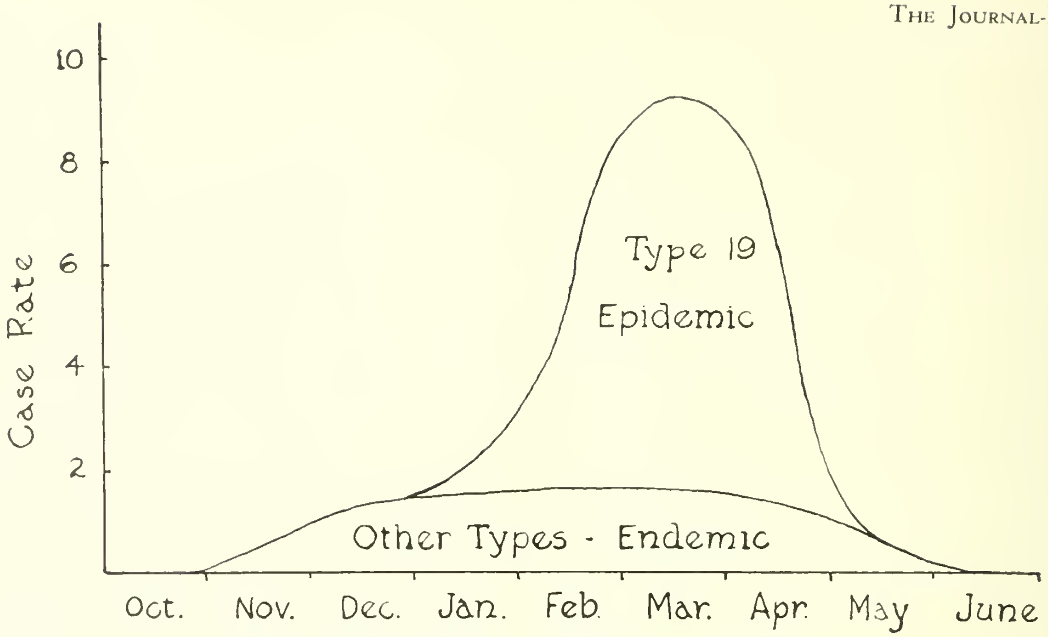

Fig. 2. Types of streptococci causing cases during a scarlet fever outbreak.

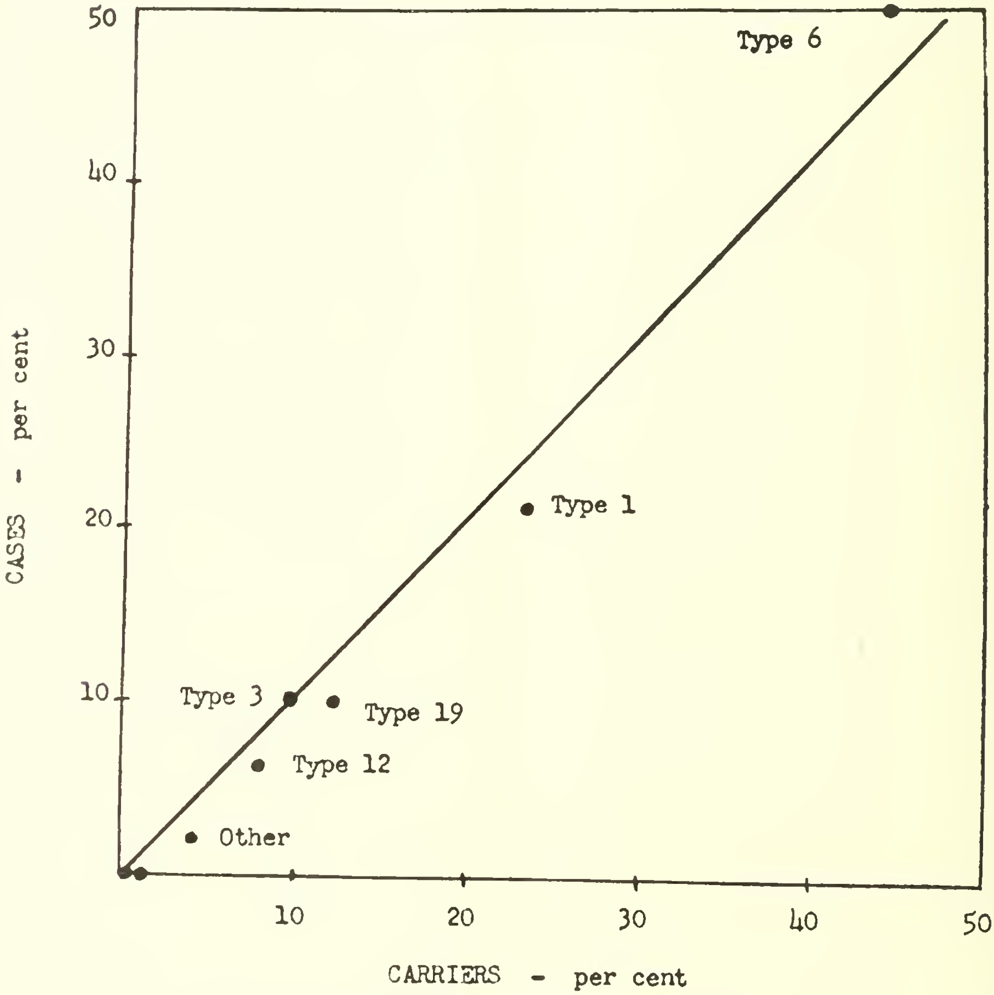

Fig. 3. The percentages of various types of streptococci found among carriers and cases of illness.

its usual course and due to its usual types of streptococci. Superimposed on this was the epidemic curve of an outbreak due to a Type 19 strain not hitherto encountered there. The fact that Type 19 suddenly caused an outbreak affected in no way the disease-producing abilities of the endemic organisms. Type 19's epidemic abilities were entirely its own.

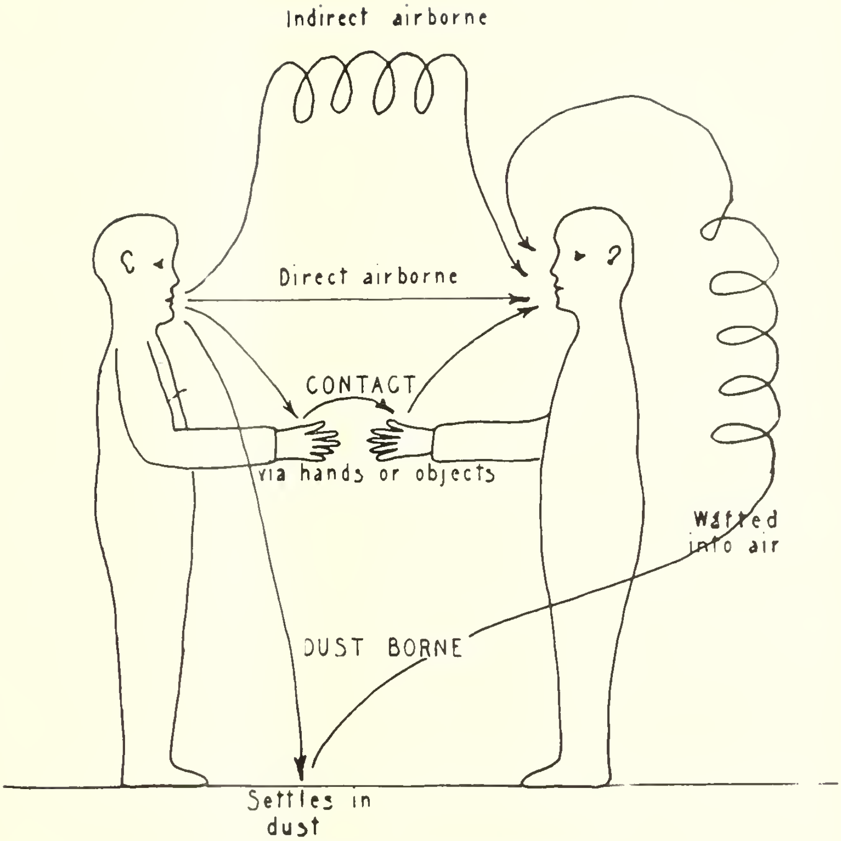

Fig. 4. Schematic diagram showing possible routes of streptococci causing cross-infections.

As I have said before, we do not know what causes a strain of streptococcus to assume increased pathogenicity. We do know, however, that concomitantly it develops an ability to disseminate itself throughout the population and that when more cases are occurring there will be more carriers. During ordinary endemic times there is a seasonal variation in the streptococcal carrier rate parallel to the case rate. Actually there is a definite relationship between the normal carrier rate and the case rate. This is illustrated in Fig. 3. Here are plotted the percentages of various types found among carriers and cases in sailors at the Naval Training Station at Bainbridge. It appears that the number of normal carriers of any specific type which appeared in a given time was directly proportional to the number of streptococcal illnesses due to that type of organism.

Earlier in our investigations I believed that the number of carriers determined the number of cases of illness. In other words, if enough carriers developed, the organism became so widely disseminated that an outbreak occurred. I have since modified these views and now believe that although certain cases can undoubtedly be traced to contact with carriers, the high carrier rate seen in epidemic times is simply a measure of the ability of the particular organism to spread itself within the population group. The normal carrier merely represents either a subclinical infection or an immune host.

In some instances, when an epidemic suddenly begins, I have been convinced that it was because a new strain of high disseminating ability was introduced into the community. I think this was frequently the case in outbreaks which occurred in Army and Navy establishments where new men were constantly being introduced from other areas. That this is not always the case is shown by our experiences in four Roumanian villages over a three and a half year period.[1] The epidemic Type 10 streptococcus was occasionally found among normal carriers in each of these villages, but no illnesses due to it were seen. Suddenly it assumed epidemic proportions in the village of Hilita and 34 cases of scarlet fever and some 60 cases of tonsillitis occurred among a population of 1000 persons. Why this organism, which had been present in the village at least intermittently for over two years without causing illness, suddenly began an epidemic I cannot answer. Either there was some change in the characteristics of the organism itself or in its environment.

Although I have said that an increase in the number of normal carriers of a given type of streptococcus is not in itself the cause of an outbreak of illness, I do not mean that carriers are not important in the dissemination of disease. It is obvious that any person who harbors a pathogenic organism is a potential vector. The important point is the number of organisms they disseminate into the atmosphere. If a person in the acute stage of streptococcal illness liberates twice as many organisms as a normal carrier, he is theoretically twice the hazard, excluding such factors as the likelihood of an ill person being confined to his room while the carrier is free. On the other hand, there are always many more carriers than actual cases in a community, so that the total hazard from carriers is probably equal to if not greater than that from sick persons. For this reason, considerable attention was paid during the war years to a study of methods of control of carriers. The Commission on Air-Borne Infections, of which I was a member, has published data from which I have borrowed freely.

In the first place, how does the organism get from the normal carrier to another person, and at what point could the transfer be blocked? Fig. 4 shows the various pathways diagrammatically. The most obvious route of transmission is the direct air-borne one. An example would be where a carrier and a recipient are standing close together in conversation and an organism from the carrier is breathed directly over and inhaled by the recipient. A second method is the indirect air-borne route. Here the carrier exhales an organism which is wafted into the air, floats around for minutes or hours on air currents and is finally inhaled by a recipient. A third possibility is even less direct. The streptococcus, once exhaled, floats in the air but, because it is surrounded by mucus or saliva, is heavy enough to settle gradually toward the floor. Either in the air or when it reaches the floor it becomes adherent to one or more dust particles. If it remained on the floor it would be of no further consequence, but each air current or eddy may waft it again into the air, where it circulates for a while and then resettles to the floor. Our studies of an outbreak of scarlet fever in a Navy radio school in New York revealed that during periods of quiet when the men were studying at their desks, the bacterial count of the room air fell to 3–10 bacteria per cubic foot. As soon, however, as the class period ended and the students filed out, the resultant commotion caused the bacterial air count to reach several thousand organisms per cubic foot. Dust counts done on the room air at the same time revealed that bacterial and dust air counts ran closely parallel, showing that the bacteria are probably adherent to the dust. In my opinion, this route of transmission is one of the most important, because the organism is repeatedly available to infect some susceptible person. Furthermore, it is probable that the majority of streptococci released by donors follow this pathway.

In hospital wards or in barracks, this mechanism frequently functions in somewhat modified form. Here carriers exhale streptococci which accumulate on the pillow case, sheets and blankets. Whenever the linen is rearranged or otherwise agitated, large numbers of streptococci are liberated into the air.

The Commission on Air-Borne Infections[3] studied this possible route of transmission by stapling or pinning small 5-inch squares of sterile cloth on the bed sheets of patients known to be carriers of streptococci. When later these test squares were washed in broth and the broth plated out for streptococci, the organisms were recovered in numbers ranging from 100 up to 149,000. In general, the highest concentration was found at head level and the lowest around the feet. Thus in one patient the concentration of streptococci on the sheet was 8,000 per square inch at head level, 160 per square inch at the level of the chest, 40 at the hips and 30 at the feet. The average bacterial concentration in this count was 2,058 streptococci per square inch of sheet surface. If we conservatively count the sheet surface of a hospital bed to be 2½ feet by 6 feet, we get a figure of more than 4,300,000 streptococci on the sheet of this bed. Even in patients where the streptococcal output was only one-tenth this amount, we still have a half million organisms potentially available for dispersion into the atmosphere. That they actually are distributed into the air, especially at bed-making times, is shown by the results of bacterial air counts done in such wards. A few streptococci can always be recovered in air samples, but during and following periods of bed-making the number of streptococci in the air rises precipitously. Each one of these organisms was a potential source of infection for some susceptible person.

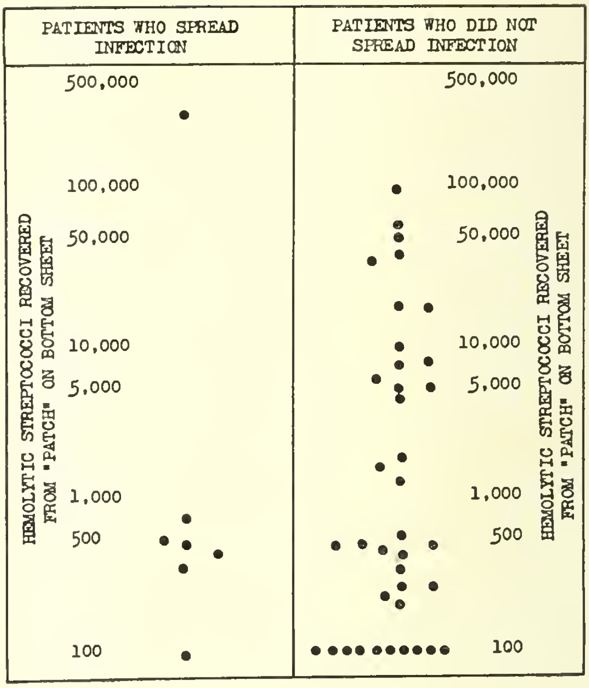

Fig. 5. Streptococcal output of patients on a ward where cross-infections occurred. Each dot represents the output of one patient. From Hamburger et al.[5]

The last mode of transmission is by contact. This possibility has also been investigated by the Commission.[4] A hundred and eighty known carriers of streptococci were asked to wash their hands in basins of sterile broth which was then plated out for streptococcal counts. Although a few of the carriers yielded no organisms, the average number of streptococci recovered from the hands of nasal carriers was 790,000 and from throat carriers, 4,700. The highest number was 21,000,000 organisms. When one considers that in normal times we have 5 to 10 per cent carriers in the population and that during outbreaks they may reach 30 to 50 per cent, the importance of this mode of transmission is obvious.

Of course it is always necessary for the streptococci to get from the hands of the carrier to another person. A few tests have been done which prove that this is easily possible in so routine a manner as shaking hands. Known carriers were asked to shake hands with non-carrier volunteers whose hands had first been rendered bacteria-free. The recipients' hands were then cultured as in the previous tests. In some instances no transfer of organisms took place, but in many cases the recipients'

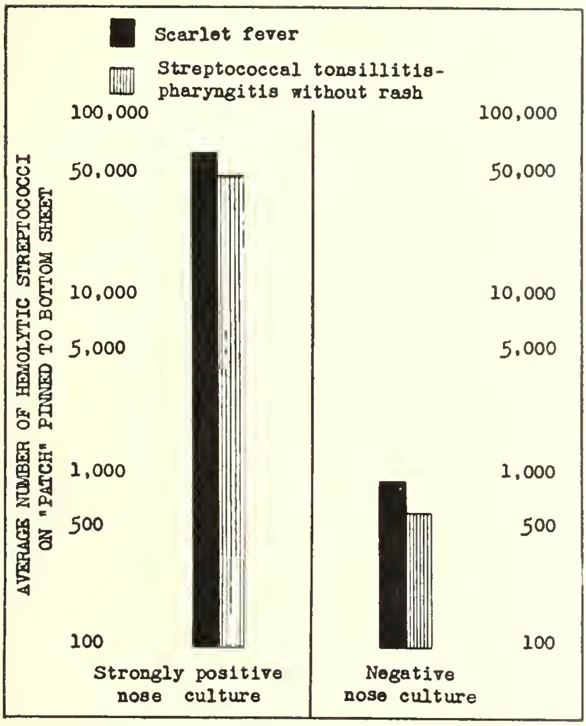

Fig. 6. Streptococcal output of patients with positive and negative nose cultures. Every patient had a strongly positive throat culture. From Hamburger et al.[3]

hands held thousands of streptococci after the handshake.

It is easy to see the implications of these hand-borne streptococci in infant's wards, for instance, where any nurse or any doctor may be an unwitting normal carrier of streptococci.

For the sake of completeness I shall also mention food as a vector in the transmission of streptococci. Outbreaks are frequently being reported in which food or milk has been incriminated. However, when an outbreak occurs, tracing the cause is usually easy because conditions have been such that the streptococci have incubated and multiplied in the contaminated food. If normal carriers can carry on their hands the thousands of streptococci we now know are possible, how many persons are infected by ingestion of food into which an unwitting carrier has introduced a few organisms which never multiplied? I see no way of tracing such individual cases, and yet they may occur daily.

Another important factor concerning carriers is that not all of them are equally dangerous. All of us have seen an occasional carrier who for no obvious reason caused case after case of illness among his contacts, whereas other carriers caused no known cases of secondary infection. The work of Hamburger and other members of the Commission on Air-Borne Infections [5] begins to shed some light on this problem. They, too, were struck by the fact that in some respiratory disease wards housing many streptococcal carriers, no cross-infections occurred, and yet in other instances a single carrier could cause a number of secondary cases. During routine culturing of the men housed in a certain barracks they

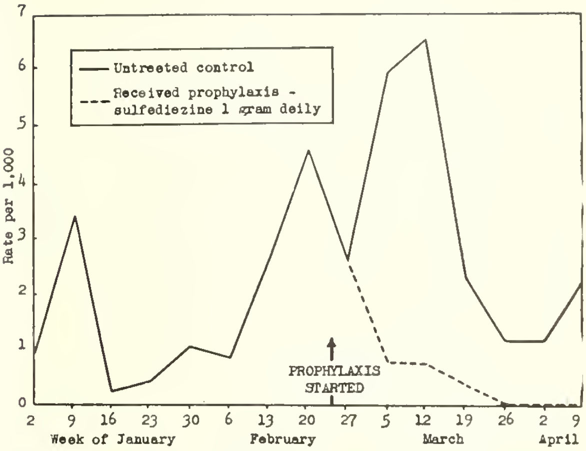

Fig. 7. Effect of sulfadiazine prophylaxis on the incidence of scarlet fever. From Navmed 284.[2]

found that one of them was a carrier of Type 46 streptococci. In the following 22 days, 10 cases of tonsillitis or pharyngitis due to this same Type 46 streptococcus were hospitalized from this barracks. At this point the carrier himself was admitted to the hospital for study and treatment, and no more cases occurred in the barracks. Both his nose and throat cultures were positive. From a 5-inch square of test cloth on his bed sheet 26,000 Type 46 streptococci were recovered. His hands yielded 436,000 streptococci. Following a course of sulfadiazine his throat and nose cultures became negative but in a few days following cessation of diazine therapy he apparently picked up other types of streptococci from his ward mates, because successive cultures revealed first a Type 17, then Type 24 and finally a Type 30 organism which he retained up to the time of discharge from the hospital. He was returned to an entirely different barracks, still carrying Type 30 streptococci, and within two weeks four men from this barracks were hospitalized with throat infections due to Type 30 streptococci.

Why, then, is one carrier more of a hazard than another? A simple explanation would be that the potential hazard of any carrier depends on the number of streptococci which he disseminates into the air. Fig. 5 [5] shows that this may well be the case. Here are plotted the relative number of organisms as measured by the patch test on the sheet, which were disseminated by carriers known to have caused secondary cases and also by carriers who caused no further streptococcal illnesses. It is obvious that the streptococcal output of carriers causing cases was generally higher than that of "benign" carriers.

There is also evidence that carriers with positive nose cultures are potentially more dangerous than those with only positive throat cultures. Hamburger and his co-workers [3] studied wards made up of all patients with positive streptococcal nose cultures and others of men whose throat cultures were positive but nose negative. Relative air counts for streptococci were made in these two wards by exposing blood agar plates. At least 25 times as many streptococci were recovered from the air of the ward housing nasal carriers as from that in which only throats were positive.

Fig. 6 shows a similar study using the patch test on the sheet.[3] By this test, nasal carriers expelled 50 times as many organisms as throat carriers. It also shows that patients with tonsillitis without rash are just as dangerous as those who have typical scarlet fever with rash.

We now come to the practical part of this discussion. What can we do in the way of control of streptococcal infections? For centuries quarantine of active cases of infectious diseases has been practiced. Everyone is now convinced that this has little or no value from a public health standpoint in diseases like streptococcal infections, where there are a dozen unknown carriers to each case. In any attempt to segregate carriers from non-carriers there must always be a lag of a day or two from the time of taking cultures until the results are known. During this interval the entire carrier picture may have changed. Furthermore, the technical imperfections of culture methods will cause some carriers to be missed. If during an outbreak segregation is made on the basis of repeated cultures, there will eventually be so few persons remaining in the non-carrier group that the separation will prove impractical. We found in our studies at the Naval Training Station at Bainbridge that during a 12-week training period, practically every person became a carrier of streptococci for at least a few days. In my opinion, at the present time any attempt to recognize and segregate carriers is impractical.

Attention has therefore been directed towards the antibiotics. Can we clear up the carrier state by the use of sulfadiazine or penicillin? Good results have been obtained repeatedly in individual cases, but when we have attempted to apply this form of therapy to large groups of carriers the results have been disappointing. Both sulfadiazine and penicillin will usually cause a reduction in the number of streptococci found in normal carriers and will frequently cause the cultures to become negative. But unfortunately, when therapy is stopped the cultures become positive again. Penicillin is better in this respect than sulfadiazine, but even it fails to maintain negative cultures regularly and the necessity of administration by injection or inhalation militates against it. There is, however, one way in which sulfadiazine has proven useful. This has been in the protection of susceptibles from infection, by routine long-continued administration of small doses (1.0 gram per day) of sulfadiazine prophylactically. This method was first used by us[6] in controlling several small outbreaks of scarlet fever in naval personnel and was later incorporated in a widespread program in both military branches. Fig. 7 shows the results obtained at the Bainbridge Naval Training Station. It is obvious that the administration of 1.0 gram of sulfadiazine per day caused a marked reduction in the case rate of streptococcal illnesses.

In addition to preventing illnesses, sulfadiazine will also prevent individuals from becoming carriers. In companies recruited during the winter months but not receiving sulfadiazine the streptococcal carrier rate rose steadily from 10 per cent to 63 per cent at the end of six weeks. In other companies, during the same time, in which each man received 1.0 gram of sulfadiazine per day, the carrier rate remained at its initial low level.

There is, however, one circumstance under which sulfadiazine prophylaxis fails. This is where the streptococcus concerned has been resistant to the drug. When the Navy sulfadiazine prophylaxis program was undertaken, no strain of streptococcus was known to be sulfa-resistant. The first results of the program were excellent. However, toward the end of the first winter it became apparent that at Farragut, Idaho, the control program was becoming increasingly less effective and to a lesser extent the same problem developed at other training stations. When investigations were completed it was found that two types of streptococci, Type 17 and Type 19, had developed resistance to sulfadiazine and that the cases which were occurring were almost entirely due to these two strains. Other types, not resistant, were still being satisfactorily controlled. But unfortunately, the two resistant types had always been among the most active, so that many cases of streptococcal infection occurred despite the prophylactic program. These strains may in time lose their resistance to sulfadiazine and others may become resistant. Nevertheless, it is obvious that any program of prevention of streptococcal infections by the use of sulfadiazine will be limited in its success to strains which are still susceptible to the drug.

It is probably unnecessary for me to emphasize the hazards of sulfadiazine and the need for intelligent control. Deaths due to the prophylactic administration of the drug have occurred. Therefore the method should never be undertaken except with constant supervision and control of those receiving the drug.

The next obvious possible way to eliminate cross-infections is to prevent the streptococcus liberated by the patient or case from reaching the susceptible persons. In recent years the bactericidal properties of ultraviolet light have come into considerable prominence in this respect. In practice ultraviolet light is usually used in one of two ways. Since it is injurious to the eyes it may be used to irradiate all the air space above eye level with the idea that organisms wafted about on convection or other air currents will eventually be carried into the irradiated zone and killed. It is obvious that this will have no effect on organisms transmitted by the direct air-borne route, since they would never reach the irradiated zone. Furthermore, tests with smoke candles have shown that there are in the average room many stagnant air pockets from which no air rises. The coating of dust particles which bacteria eventually get if they are free in the air for any time also seems to protect them from the ultraviolet rays. Under the best conditions we could produce, we were never able to reduce the bacterial count of the air in rooms in which the upper zone was irradiated by more than 50 per cent. This result does not, in my estimation, justify the expense and trouble of installation and operation. I have not yet seen any really conclusive reports on the value of this form of radiation in reducing actual cross-infections.

There is one form of ultraviolet radiation which, I believe, has a definite though limited usefulness. This is the so-called ultraviolet barrier. Tubular ultraviolet lamps are so arranged about a cubicle in a ward that no bacteria or virus can be wafted into or out of the cubicle without being exposed to radiation. The killing effect of ultraviolet rays is a product of the intensity of the radiation times the length of exposure. It is obvious that if there is a sudden gust of air an organism can be wafted past the light barrier so rapidly that it may escape death. However, in order to infect another patient it must still cross the barrier of that person's cubicle lights. Although not invariably successful, this method, I believe, has the most promise.

Still more recently, aerosols have come to the fore. Robertson and his co-workers [7] found that propylene and triethylene glycol, when suspended in the air in the form of vapor, have the property of rapidly killing all organisms tried in their test chambers. Although the method has considerable promise, it is still far from the practical stage. It is necessary to maintain a relative humidity in the rooms of 50 to 60 per cent saturation. The glycol itself must be vaporized in the air at so close to the saturation point that a definite fog frequently develops. Bacteria are apparently protected from its action by the dust envelope they acquire, so that we were unable to get better than a 40 per cent reduction in bacterial air count in inhabited rooms. Studies on the control of actual cross-infections in wards are still under way. The method has promise but has not yet been developed to the practical stage.

I have already mentioned the hazard involved from streptococci which collect on sheets and blankets. I believe this is one of the most important vectors in the transmission of streptococcal infections in wards or barracks. Recently water-soluble oil suspensions have been developed in which sheets and blankets are rinsed as the final step in laundering. This treatment leaves a residual inapparent film of oil on the cloth which entangles the bacteria and effectively reduces the number of streptococci liberated into the air. When floors, as well, are oiled to reduce the number of settled bacteria which intermittently become air-borne, the method has, in my opinion, great promise.

I believe, however that up to date there has been developed no satisfactory substitute for the entirely closed cubicle or individual room for the care of infant patients.

The final possibility of preventing infection with streptococci is to reduce the number of susceptibles. I have already discussed this in part under sulfadiazine prophylaxis. Another possibility has been to investigate methods of immunization. We undertook this study while in the Navy with the belief, on the evidence of animal experiments, that immunity to streptococci is largely type specific, and that previous attempts at immunization had been unsuccessful because they had been made before the discovery of the various streptococcal types. Since at any given time an outbreak of streptococcal infections is caused by only one or a few types, it was hoped that a vaccine made up of the prevalent types would materially reduce the number of infections. Our results with immunization, using vaccines made from only a single type of streptococcus showed a 33 per cent reduction in total numbers of streptococcal infections among the immunized men as compared to controls. Moreover, to our surprise, the protection was not type specific. Neither was there any reduction in the number of normal carriers. This line of investigation was eventually discontinued when we were transferred to another naval unit and other duties, but in my opinion, it holds some promise, although its applicability will be limited at best.

I think it is apparent that the whole subject of the epidemiology of streptococcal infections is exceedingly complex and that only the surface has been scratched. Therefore, if I have done little more in this discussion than outline a series of rather disjointed observations, I hope the reasons will be understood. As more observations are made, the interspaces in our knowledge will fill in to produce a fabric of facts that will eventually lead to some more satisfactory methods than now exist for the control of streptococcal infections.

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Exchange Transfusion

A New Method of Treatment for Erythroblastosis Fetalis

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ERYTHROBLASTOSIS fetalis, or congenital hemolytic disease, has been recognized for many years as a clinical entity. It has been classified in recent years into icterus gravis, hydrope fetalis, and anemic types. It was Blackfan, Diamond, and Baty [1] who in 1932 first presumed that all three conditions were manifestations of one disease. In 1941 Landsteiner and Wiener [5] published their work which demonstrated an agglutinable (Rh) factor in human blood which could be recognized with immune (anti Rhesus) serum. More detailed information about the "Rhesus" factor has been revealed by Diamond,[4] Wiener,[12] Levine,[6] Race and Fischer.

Since 1941 several subtypes of the first Rh factor have been discovered. Investigators first thought that there were only two types of Rh factor; Rh negative (rh) and Rh Positive (Rh). Subsequent investigations have shown that there are eight primary Rh types;

1. Rh negative (found in 15 per cent of white persons)
2. Rh positive (found in 85 per cent of white persons)
   a. Rh_0
   b. Rh_0' (or Rh_1)
   c. Rh_0'' (or Rh_2)
   d. Rh'
   e. Rh''
   f. $Rh' Rh''$
   g. $Rh_1 Rh_2$

1 and 2a account for 92 per cent of the cases of erythroblastosis.

Rare additional factors are: (1) Hr factor; found in Rh negative bloods and certain Rh positive bloods. (2) A and B factors.

Treatment of erythroblastosis fetalis has hitherto been directed primarily and too often at the anemia only. Rh positive blood cells were used, thereby adding "fuel to the fire." Studies[11] have shown that the fate of these Rh positive cells is early hemolysis (along with the infant's own Rh positive cells). It is true that some infants whose livers might tolerate the products of this hemolytic (and possibly agglutinative) reaction no doubt did survive in spite of the added Rh positive cells. Newer knowledge regarding the pathogenesis in erythroblastosis however makes liver protection the therapeutic keynote especially in the more severe or "toxic" types which manifest themselves most after birth.

Davidsohn [3] and Potter [8] have shown that survival from erythroblastosis depends on the degree of liver damage. Isohemolysis is believed to produce (1) anoxemia and endothelial damage, (2) extra-medullary hematopoiesis with circulatory impairment, and (3) intrahepatic biliary stasis resulting in obstructive jaundice. The reactions tend to become irreversible, resulting in severe icterus, anemia, purpura, hypoproteinemia with edema and other evidences of hepatocellular degeneration.

Milder cases of "pale" babies have been cured and a few of the toxic types have been spared by the repeated therapeutic transfusion of Rh negative blood. The course has often been long, however, and frequently attended by a prolonged "aregenerative" phase during which the hemoglobin and erythrocyte levels remain low. More recently transfusion of Rh negative red cells has been used to furnish red cell volume at once and simultaneously avoid excesses of plasma. Even this procedure has failed in most of the 30 per cent of erythroblastotic babies born alive who had severe hepatic damage.

With an improved concept of the pathogenesis of erythroblastosis [4,7,8,13] it became apparent that a new method of treatment must be sought which could prevent progressive hemolysis (or "in vivo" agglutination) and its end products of damage to the liver,[3] blood and brain. The procedure here described was recently used by Diamond, Wiener, Bloxsom [2] and Wallerstein,[10] with somewhat variable details of technique. It consists in withdrawing the infant's Rh positive cells and maternal antibody and replacing these with safe Rh negative cells and "normal" plasma.

TECHNIQUE OF TRANSFUSION

At birth the umbilical cord is cut about 6 inches long. The cord is then cut to the desired length, about 0.5 to 1 inch in length. The catheter is inserted into the umbilical vein for a distance of approximately 10 cm., measured from the stump of the umbilical cord. To make the insertion easier, the cord is threaded up onto the catheter to avoid rupture of the umbilical vein by excessive downward pressure. Some difficulty may be encountered because of the tortuous course of the umbilical vein which retards forward motion of the catheter. Patience and caution are necessary to avert rupture of the umbilical vein.

As soon as the umbilical catheter is in place (theoretically in the ductus venosus) the transfusion is ready to be started. The catheter is anchored firmly in place and the operator withdraws a blood sample and then continues to withdraw blood in 10 cc. quantities. As each 10 cc. quantity is about to be discharged into the exhaust bottle, a squirt of heparin is made into the plunger of the syringe to aid in preventing clotting of the blood in the exhaust system. After 40 cc. of blood are withdrawn a similar quantity of Rh negative "o" blood is infused via the same route without heparin. This is continued until a quantity of blood somewhat over the baby's calculated blood volume (70 cc. per kilogram of body

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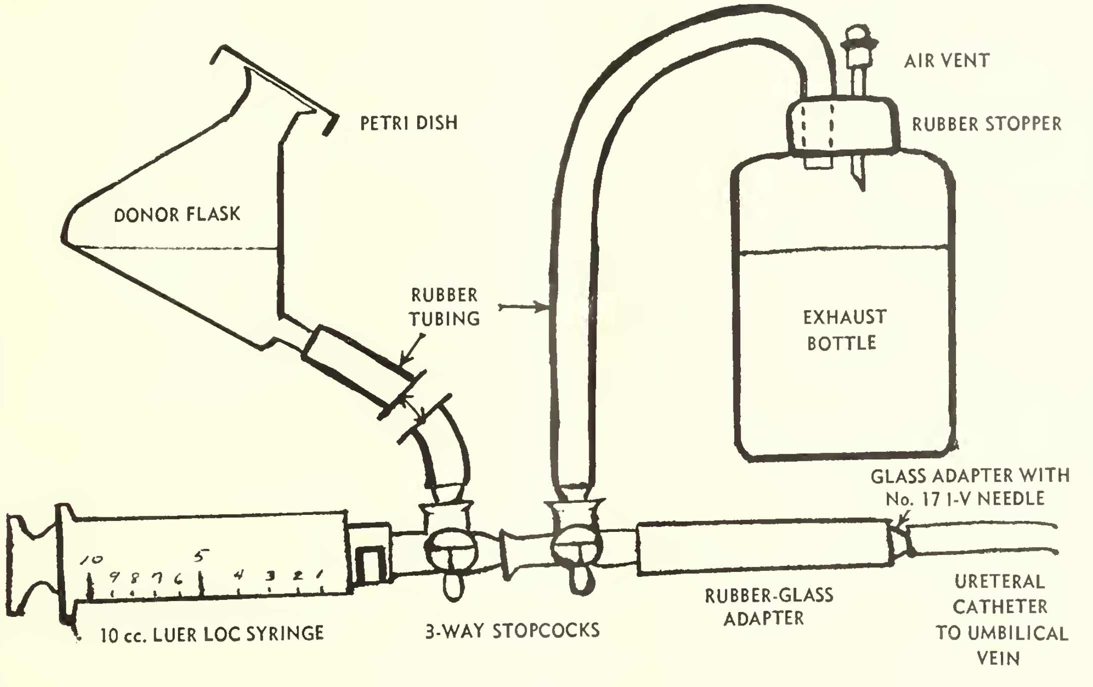

EXSANGUINATION TRANSFUSION SET

Diagram

Equipment used for Exchange Transfusion

(1) Rh negative "o" blood with the plasma removed and one half of it replaced by saline. Witebskey (A-B) substance added to neutralize any anti A or B. The other half of the plasma is restored to the blood.
(2) Erlenmeyer flask such as used in routine pediatric transfusion sets.
(3) Two three-way stopcocks.
(4) Two rubber adapters with glass adapter in one end (see diagram).
(5) Needle, No. 17 intravenous, inserted into No. 8 or No. 9 ureteral catheter or Diamond's plastic catheters if available.
(6) Three 10 cc. Luer-loc syringes.
(7) Two accessory No. 17 intravenous needles.
(8) Two accessory three-way stopcocks.
(9) Two extra rubber-glass adapter connections.
(10) Two accessory ureteral catheters with No. 17 intravenous needles inserted.
(11) Exhaust bottle and adapter (see diagram).

Additional Accessory Equipment

(1) Heparin
(2) Saline solution—two 250 cc. bottles.
(3) Venisection tray with sharp fine scissor, silk suture, mosquito forceps.
(4) Several packs sterile towels.
(5) Accessory pediatric transfusion set.
(6) Merthiolate in sterile medicine glass.
(7) Sterile finger draps.
(8) Standard from which to suspend donor blood bottle.
(9) Strong spotlight lamps.
(10) Cord ties.
(11) Penicillin.

weight) has been injected. The initial sample of blood is tested for hemoglobin, serum bilirubin, Rh types, Landsteiner blood type, blocking antibody and anti-Rh antibodies. At the midpoint and end point similar tests are done on samples drawn. In withdrawing blood for samples a few cubic centimeters are first withdrawn and discarded to clear the system of the Rh negative "o" blood. If ideal results are achieved the baby will be temporarily Rh negative "o", will have no blocking antibody, and will show a few or no anti-Rh antibodies. An alternate method if the umbilical vein exchange fails is to exsanguinate via the radial artery at the wrist while infusing through a canulla in the vein.

Since the best results can be achieved by using these methods as a prophylactic measure soon after birth, the criteria for their use may be stated as follows:

(1) Marked or abrupt rise in "regular" or in "blocking" antibody titre during pregnancy.

(2) History of loss of other erythroblastic babies with or without a sudden rise in blocking antibody titer. (Since this finding is not a solitary criterion it is neither an absolute indication.)

(3) Multiparity; over 90 per cent of erythroblastic babies are born to multiparous women.

(4) At birth or soon after:
  a. Jaundiced or hydrops (best not to wait for these signs).
  b. Normoblast count over 10-15 per 100 white blood cells.
  c. Persistent downward trend in hemoglobin and erythrocyte values despite regular transfusions; (this suggests subtypes of Rh positive as an etiologic factor).

(5) The father is homozygous as determined by Hr tests.

It has been our privilege to treat two prematurely delivered babies whose genetic and serologic background conformed to these criteria.

CASE PROTOCOLS

Case 1. Mrs. P., a patient of Dr. C. J. Ehrenberg, was a 42-year-old multipara, gravida 8, para 2. The first pregnancy went to term in 1933 with delivery of an apparently normal 7-pound male infant. On the 7th day of life he became pale and listless and was seen by one of us. He was transfused with apparently good results. There was no apparent jaundice. At 4 months of age he was found dead in his crib. The cause of death was undetermined after autopsy.

Between 1933 and 1935, a miscarriage occurred. This event occurred in the second month of pregnancy. The second pregnancy that went to term was in February, 1935. The infant was born on February 16, was quite jaundiced, and blood smears showed many young erythroblasts. On February 18, the baby's skin was quite pale and hemoglobin determination showed 8 gm./per cent with a red count of 2 million cells per cc. of blood. The white count was 9,100. The baby was given liver and iron and finally transfused on March 1. The hemoglobin on March 2 was 6.9 gm./per cent. A second transfusion of 50 cc. of Rh positive "o" blood was then given. The baby was discharged after one month in apparently normal condition. It weighed 7 pounds 5¾ ounces on discharge and has always been well except when he was treated for a duodenal ulcer at the age of 8 years.

Between 1935 and 1938 two spontaneous abortions occurred. In 1938 the patient was again pregnant. The onset of this labor was one month premature. A 5 pound 7 ounce female infant was delivered. At birth she was severely jaundiced and showed edema of almost all parts of the body. Her hemoglobin was 13.5 gm. and the red cell count was 2.5 million per cubic mm. There were 512 normoblasts per 100 white cells and the blood morphology was interpreted as "immature development of all elements." The baby's blood type and the father's blood type were the same—"O" or Landsteiner type IV. The mother's blood type was not recorded at this time.

The day after birth glucose was started by mouth. The baby's serum and the father's blood cells showed no agglutination. On this day the hemoglobin was 12.5 gm./per cent and the baby was jaundiced and edematous. Fifty cubic centimeters of the father's blood was transfused. The baby became more severely jaundiced and listless. The hemoglobin, despite transfusions, was 12.1 gm./per cent and the child seemed more edematous. The hemoglobin continued to drop, being recorded at 10.2 gm. and 8.5 gm. at which time the icterus index was over 100, and the skin, while less edematous, began to take on a definitely greenish hue. The peripheral blood still showed a good deal of anisocytosis, poikilocytosis polychromasia and immaturity of cellular elements.

One-half cubic centimeter crude liver extract and iron were given every other day. Another transfusion of 45 cc. of the father's blood was given. The skin color was a little improved but the urine showed traces of bilirubin. The patient's hemoglobin was next recorded at 8.2 gm. She was more green in color and the prognosis appeared doubtful. Another 50 cc. of the father's blood was given. Following this the edema seemed less and the hemoglobin was 11.1 gm. The child gradually improved until the time of discharge from the hospital. At the time of discharge the baby weighed 7 pounds 7½ ounces. The hemoglobin was 12.9 gm. This child developed a spastic hemiplegia during infancy.

The last pregnancy was expected to terminate on April 10, 1947. During this pregnancy it was found that the mother was Rh negative "A", and the father was Rh positive "O". Rh antibody tests showed definite sensitization as early as Dec. 6, 1946. The patient showed traces of "blocking" antibody but none of the "early" or "regular" anti-Rh antibodies. By January 27, 1947, the patient showed very definite sensitization as judged by a rise in blocking antibody titre (which is interpreted by Wiener as indicative of impending erythroblastosis fetalis in the infant) in a dilution of 1:64. "Early" antibody was found only in traces. In view of the degree of sensitization of the mother early termination of pregnancy by cesarean section was decided upon. On March 5, 1947, cesarean section was performed and a 5 pound 1 ounce male infant was delivered. The child at first responded poorly; artificial respiration, suction, and intramuscular coramine were used to bring about normal respiratory function. After this the baby seemed in apparently good condition. The cord blood was found to be "O" Rh positive with a marked degree of anti-Rh antibody although the conglutination test showed no "blocking antibody" to be present. Replacement transfusion was instituted by the technique outlined previously. The initial normoblast count on the day of birth was 22 per 100 white blood cells. In view of the condition of the blood and a calculated blood volume of 180 cc. the baby was infused with 220 cc. of Rh negative "O" blood while 200 cc. of the baby's blood was withdrawn (a theoretical exchange of about 65 per cent of the baby's original blood volume). The child, originally Rh positive, tested Rh negative after the transfusion and no antibodies could be demonstrated. The post-transfusion hemoglobin determination was 15.6 gm./per cent. The following morning the hemoglobin was 15.0 gm./per cent and the red blood count was 4.76 million per cubic millimeter of blood. On the second day of life the liver was palpable just below the costal margin but the spleen could not be felt. There was a mild degree of icterus. On March 7th there was a slight agglutination for anti-Rh antibody. The hemoglobin was 12.6 gm. with a red cell count of 4.06 million per cmm. of blood, and there was a faint test for anti-Rh antibody; the blood tested faintly Rh positive. The total serum bilirubin by the Van den Bergh test was 6.0 mg./per cent. By March 11 the patient's color was much better and he was taking his feedings quite well. At the time of the paper's publication the patient has required one small transfusion of Rh negative red blood cells. He is doing well and his blood levels have remained normal.

Case 2. Mrs. S., a patient of Dr. P. N. Larson, a 30-year-old white housewife, was a multipara, para 0, gravida 3. One child died following uterine inertia necessitating craniotomy. The second pregnancy produced twins at the sixth month of gestation following spontaneous rupture of membranes a month earlier. These babies lived only 3 days, death being due presumably to "prematurity". No Rh studies were reported during either of these two pregnancies.

The current pregnancy began in mid-July, 1946, but the actual date of the last menstrual period could not be dated accurately. During the pregnancy a constant rise of blocking antibody was not observed but anti-Rh antibody appeared and during the middle months of the pregnancy showed a sharp rise. At 5 months of gestation the mother began to show some spotting of blood from the vagina. She was hospitalized almost 2 months during which time the bleeding ceased. At 34 weeks of gestation the patient again began to bleed. She was hospitalized again for a week during which time X-ray and physical examination revealed a central placenta previa. On March 20, 1947, at 36 weeks of gestation, the patient's membranes ruptured. In view of the placenta previa a cesarean section was immediately performed.

A normal 4 pound 11 ounce male infant was born. He cried and moved spontaneously and seemed to be clinically normal. The cord blood showed that there were no blocking antibodies present, but the baby was an Rh positive "A" and showed anti-Rh or "early" antibody in a dilution of 1:2. The mother was Rh negative, "AB". The baby's hemoglobin was 13.8 gm. and the serum bilirubin was 2.54 mg./per cent. There were 9 normoblasts per 100 white blood cells. It was felt that because of the strong maternal antibody titre, exchange transfusion was warranted. This decision was supported by the mother-father Rh incompatibility and the loss of all previous pregnancies.

The father was Hr negative. Accordingly, 230 cc. of the baby's blood was replaced by 270 cc. of Rh negative "O" blood. Subsequent to transfusion the baby tested only faintly Rh positive and there were no demonstrable anti-Rh antibodies. The baby's color and cry were excellent; the hemoglobin was 15.7 gm./per cent; the normoblast count had dropped to 2 per 100 white cells, and the serum bilirubin had dropped to 1.58 mg./per cent with a red blood cell count of 4.81 million per cubic millimeter of blood. The following day the hemoglobin was 16.2 gm./per cent. Since transfusion the baby has had two slightly cyanotic spells and during the first week he was definitely icteric. This has now cleared and the baby appears in excellent condition.

Comment

The indication for exchange transfusion may sometimes be questioned because the clinical condition of the infant is apparently good at birth. As Wiener[13] and Wallerstein[10] have pointed out, an apparently normal infant born of "erythroblastic" parentage will often develop jaundice, clinical kernicterus, listlessness, marked anemia, purpura, and bloody emesis. Death often ensues if a short delay occurs before treatment is begun. This has frequently been observed in infants with normal erythroblast count, slight anemia, and no petechiae or visible icterus. The prognosis for an infant whose parents are incompatible Rh types and whose mother shows increasing blocking antibody or "early" antibody levels in the course of pregnancy is theoretically grave, despite essentially normal physical findings at birth. In Case 1, the multiparity of the mother, the incompatibility of the parents, the homozygosity of the father, the increased sensitivity of the mother, and the initial normoblast count were indications enough for exchange transfusions. In Case 2, the factors were multiparity, loss of previous infants, rising titer of maternal antibody, elevated serum bilirubin and paternal homozygosity. Wallerstein reported 8 cases that appeared normal at birth. The indications were exactly comparable. In those in which exchange was done at once, complete recovery occurred, whereas in those with a delay of 24 to 48 hours before treatment, death resulted in spite of exsanguination and replacement. Bad results from compromises of this type where early removal of positive red cells and maternal antibody was not done are illustrated in Case 3.

Case 3. Baby boy F. S. was delivered at Northwestern Hospital during 1946. He weighed 8 pounds 13 ounces, had a good color and cry, and to all appearances was a normal baby. The obstetrician stated that the mother was Rh negative and that the father was Rh positive. The family history showed that the first baby, born in 1939, was entirely normal. The second baby, two years later, became jaundiced shortly after birth, was not transfused, and died on the second day of life. The third baby, born in 1942, was jaundiced a few days after birth, was transfused three times (type of blood not known) and recovered. The mother had had no miscarriages.

Blood studies on this baby showed 15.4 gm./per cent hemoglobin, 4.38 million red cells, 42 per cent neutrophiles, 16 per cent lymphocytes, 6 per cent monocytes, 2 per cent eosinophiles, and many very immature cells. The normoblast count was 10 per 100 white blood cells with marked polychromasia and large cells. The day after birth the patient became severely jaundiced, listless and weak. The subsequent course, despite transfusion of Rh negative "O" blood was steadily downward. The baby died on the fourth day. Autopsy revealed massive hepatosplenomegaly with kernicterus, liver atrophy (microscopic), patent ductus arteriosus, and hemorrhagic pneumonia.

This case again illustrates what small significance the individual signs such as normal erythroblast count and apparently normal clinical picture at birth can mean in prognosticating the need of exsanguination transfusion in the treatment of erythroblastosis fetalis.

Case 4. Mrs. L. had had eight pregnancies. The first two children, full term infants, died with cyanosis within 48 hours after birth. Death was classified as "thymic enlargement." The third child, Rh positive like its father and mother, was born with anemia, although blood smears showed no apparent morphological abnormality. In spite of daily blood transfusions with Rh negative "O" blood the child became more icteric, listless, and after several days died. Autopsy showed "hepatic degeneration and icterus." The pathological report gave the diagnosis of "congenital hemolytic anemia" or "erythroblastosis." In the light of recent work on the Rh factor it is probable that a subtype incompatibility was operative.

This case represents another example of the statement made earlier in this paper that the initial blood findings in the potentially erythroblastotic infant, or the clinical picture of the child who appears normal at birth, cannot be relied upon to give an adequate determination of which baby should be treated by the replacement transfusion method.

Even after exchange transfusion there may be a progressive, refractory anemia characterized by an aregenerative phase. Regular transfusion often seems to prolong rather than relieve this condition. Crude liver and iron are worthy of trial. Transfusion is usually withheld unless the hemoglobin is in the neighborhood of 8 gm., and the red cell count 2,500,000, at which time transfusion of red cells only seems to be curative. The authors have had opportunity to treat such cases by infusion of Rh negative red cells washed in saline. The restoration of normal hemoglobin was immediate and has been permanent.

It is our opinion that if the genetic, serologic, and obstetric histories of the parents conform to the criteria mentioned herein, exchange transfusion is indicated as a prophylactic measure against erythroblastosis fetalis. The latent jaundice and subsequent "aregenerative" phase experienced in our cases are evidence that even in the cases in which exchange transfusion was used, perceptible antibody remained stored in body tissues and appeared later in the blood. The relatively innocuous nature of an exchange transfusion and the infusion of carefully tested Rh negative "O" blood offer no known contra-indication to the procedure, while failure to exsanguinate such an infant may postpone treatment until the condition has progressed beyond salvage. Needless to say a well-equipped blood transfusion laboratory makes for greater safety in processing donor blood and testing for antibody.

Summary

1. Two cases of impending erythroblastosis fetalis have been treated successfully by the exsanguination transfusion technique herein described.

1 (a). Two similar cases unsuccessfully treated by currently used transfusion techniques are presented.

2. The indications were multiparity, previously-born erythroblastic babies, rising antibody titer, paternal homozygosity and serological abnormality in the baby.

3. With these indications prophylactic or early treatment is imperative. Delay has been shown to result in irreparable liver damage.

4. The routine employment of early induction or delivery by cesarean section is to be discouraged except in selected cases.

5. Liver, iron, and accessory transfusions of Rh negative cells (suspended in saline) are occasionally necessary to combat the aregenerative phase so frequently met in these cases in the first few weeks of life.

6. Washed maternal red cells are safe for single accessory transfusion when an Rh negative donor is difficult to find.

7. It is our impression that some factor in plasma besides maternal antibody from other tissues may contribute to the aregenerative phase. (X-protein?)

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SIMILARITY OF HISTOPLASMOSIS AND TUBERCULOSIS IN CHILDREN

Christie (*Journal of Public Health,* 1945) has recently emphasized the importance of considering histoplasmosis in the differential diagnosis of diseases presenting symptoms similar to tuberculosis especially among children in the Mississippi River Valley.

Epidemiological studies reveal that the disease is more common in rural areas especially in regions bordering on swampland. According to Iams and Keith (*Journal of Pediatrics,* February, 1947), 88 cases have been reported since Darling's first report from Panama in 1906 (*J.A.M.A.,* 1906). Twenty-eight of these were children. To date most cases have been reported post mortem, although recently there has been an increase in clinical diagnoses.

The clinical findings consist of fever, loss of weight, chronic cough and diarrhea, hepatosplenomegaly, lymphadenopathy, anemia and leucopenia. Blood studies, lymph node and bone marrow biopsy will usually show the characteristic histoplasma capsulatum fungus.

The X-ray findings in the thorax in tuberculosis and histoplasmosis are very similar, and in those who live, histoplasmosis frequently leaves areas of calcification. The tuberculin test is negative, whereas the histoplasmin test in the skin is positive. The disease always has to be differentiated from lymphoblastomatous diseases, pancreatic cystic fibrosis, syphilis and erythroblastosis.

Diagnosis of this disease is especially important in this area because of the endemic nature of the disease and the poor prognosis, unless early diagnosis and vigorous treatment is pursued.

The Quantitative Aspects of Fluid Therapy in Infants and Children

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Stability of the fluid matrix of the body is the first prerequisite to sound health. The maintenance of this "steady state" both qualitatively and quantitatively is dependent upon several factors. The most important of these is the joint action of the various hormones and the autonomic nervous system. These control the absorptive, circulatory, respiratory, secretory, and excretory functions. Under strains of gains or losses of body fluid and electrolytes, each of these systems play an important part toward maintaining a proper fluid composition necessary for the normal function of the tissues.

In order to obtain a rational therapeutic approach to the problem of fluid and electrolyte losses that are associated with many of the clinical problems in the field of pediatrics, it is necessary to use our present knowledge of the physiologic mechanisms that are concerned in this control constantly. This is of particular importance in the field of pediatrics because of the greater susceptibility of the small infant and the child to conditions which influence the fluid matrix of the body tissues.

There are many reasons why the infant and the child have greater difficulty than adults in maintaining the stability of their fluid composition. One of these differences is the relative per cent of body water in relationship to the body weight of the infant as compared with the adult. There is, as we know, a greater amount of water per unit of tissue in the infant at birth compared with the older child or the adult. However, this difference is not striking. The most striking difference is in the water composition of certain organs of the body. One organ markedly different is the brain. (Figure 1.) It will be noted that the per cent of water of the brain of the infant at birth is about 89 per cent, whereas at three years of age it has fallen to 81 per cent. The importance of maintaining a proper fluid composition of this organ during disease is obvious.

In addition, there is further evidence to support the fact that the distribution of water in the body of the infant is different than its distribution in the adult. An analysis of infant cadavers has shown that the space occupied by sodium, the ion found predominately in the extracellular space, represents about one-half of the total body water of the infant at birth. In addition, the injection of substances, such as sucrose, sodium thiocyanate, bromide, and sulphate into the adult reveals the fact that the extracellular space of the mature individual is about one-third of the total body water. This extracellular space may be divided into two compartments; the fluids which bathe the cell, or the interstitial compartment, and the fluid of the circulating system. Here, also, a breakdown of these compartments reveals another difference in the infant as compared with the adult; namely, that of a greater volume of circulating fluid per kilogram of tissue for the infant than that of the adult. Thus, with increasing age, there is a constant decrease in the volume of fluid in the intercellular space with only a slight degree of fall in the total per cent of body water in relationship to weight.

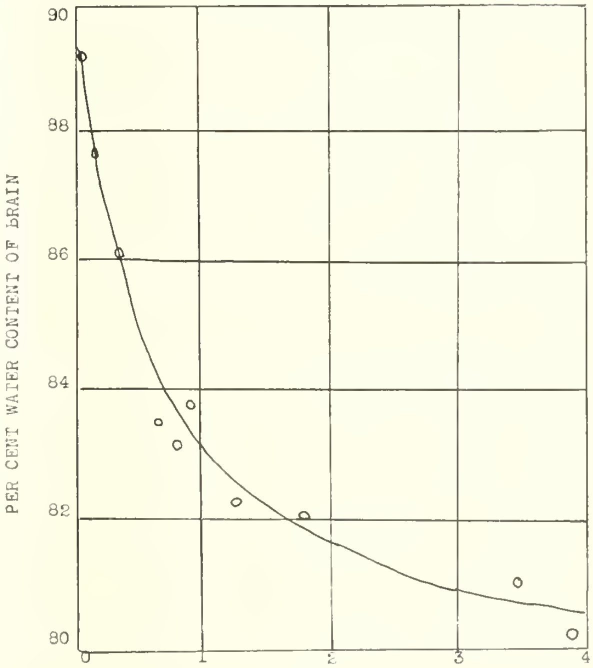

Figure 1

Apart from these anatomical differences associated with age, further physiological differences exist. Figure 2 diagrammatically represents the relative differences between the water requirement for the infant as compared with the adult. Thus, per each twenty-four hours, the child needs a maintenance requirement of fluid, which, per kilogram of body weight, is two to three times greater than that of the adult, or, in other words, an adult weighing 70 kilograms will drink an amount of water equivalent to his body weight in 35 days, whereas the infant of 10 kilograms drinks an amount of water equivalent to his body weight in about 7 days. There appears to be necessary in the infant a rate of water turnover that is some five times greater than that of the adult. This fact is supported by the great heat production per kilogram of body weight for the child as compared with the adult. The great demand of water

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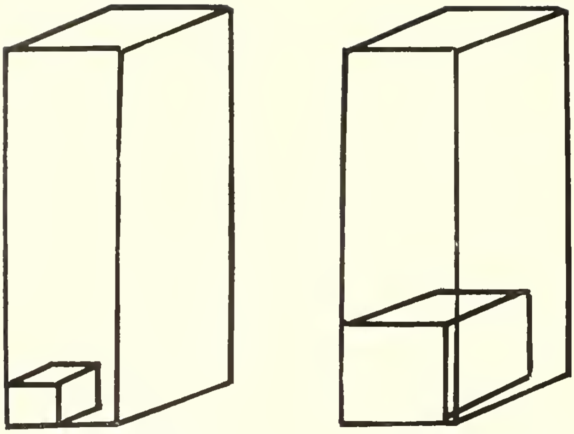


Adult—70 kgm.
Water Requirement =
30 cc. per kgm. per day.

Infant—10 kgm.
Water Requirement =
150 cc. per kgm. per day.

Fig. 2. Cube represents mass of water required for total mass of infant and child. An adult requires an amount of fluid equal to his body weight every 35 days. An infant requires an amount of fluid equal to his body weight every 7 days. Water requirement for both infants and adults about 100 grams per 100 calories basal heat production.

for the functions of heat loss and for the excretion of waste products by the kidney is much greater in the child than it is in the adult. These differences, however, may be reduced to a common factor, and that is, the amount of water required per calorie for the infant and adult is not strikingly different. In other words, about 100 grams of water is required for every 100 calories of heat produced by the adult, and only about 110 to 120 grams of water is required for every 100 calories produced by the infant.

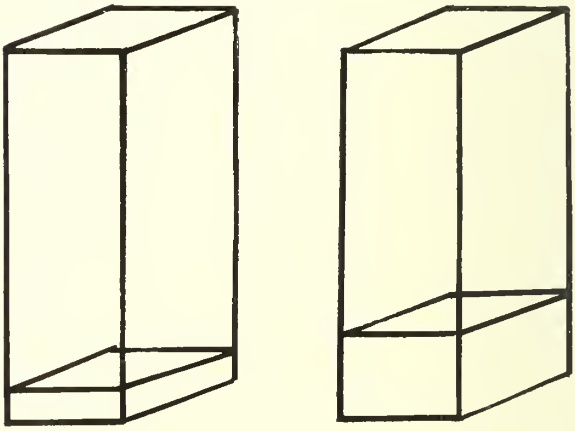
For a rational and practical therapeutic approach to the problems which disturbances of the fluid composition of the body offer, it is necessary to have at our command information in regard to the qualitative and the quantitative nature of the changes in these compartments under the influence of loss. Fluid losses from the body are predominately of two types; one in which there is a loss of water, and one in which there is a loss of water and electrolytes. The changes, then, which occur in the fluid compartments differ somewhat when the fluid loss is predominately of one type. Thus, a fluid loss which consists of water plus electrolytes drains, at first, predominately from the interstitial space, which serves as a reservoir to meet the needs for both salt and water under the influence of strain. Thus, in a diarrhea, where the loss is chiefly that of sodium and water, there may be for some time no apparent change in the solid elements of the blood, such as the protein and hemoglobin, even though weight loss is continuing. In other words, the interstitial space has served as a reservoir, protecting a loss from the vascular system. On the other hand, a reduction in the fluid intake or a loss of water from the body without loss of electrolytes, after initial compensatory adjustments, causes a progressive loss of water from all compartments of the body at about the same time. Thus, even with very slight changes in water loss, an increase in the hematocrit and the plasma protein concentration of the blood may occur relatively early, and be, in a rough way, a measure of the degree of water loss from the body.

Because of the greater water requirement for infants as compared with adults and the differences in the distribution of this water, mechanisms which produce a loss of body fluid exert a more profound effect both quantitatively and qualitatively.

To demonstrate this, Figure 3 diagrammatically represents a comparison between the amount of fluid lost from an infant and from an adult in relationship to the total mass of the individual. Here it is noted that an infant in a state of severe dehydration has lost as much as 20 per cent of his body weight as water and electrolytes; whereas, the adult in a similar state of severe dehydration has only lost somewhere between 8 to 10 per cent of his entire body weight as water or electrolytes. This diagrammatic representation, as well as the one on Figure 2, indicating requirement of water for maintenance of the fluid balance, serves to demonstrate the quantitative differences between the infant and the adult as well as the physiologic differences that occur when deprivation of water is present.

It is necessary to mention one further difference associated with the dehydrated state in infants and children as compared with that of the adult. The clinical conditions associated with the dehydration are often accompanied by the refusal of food, vomiting, and fever. Thus, in children a fairly intense ketosis develops rapidly. The adult, on the other hand, may show only a slight degree of ketosis within 24 hours, and usually continues to maintain some fluid intake during his illness, particularly when it is of an infectious nature. This ketosis, then, by its acid composition, intensifies the rate of fluid loss by forcing the kidney to excrete these acids, adding another mechanism of fluid loss.

These differences lend support to the general statement that the younger the animal, the greater the state of flux in regard to his physiologic activities. Emphasis must then be placed on the necessity of immediate recognition and the urgency of restoration of the dehydrated



Adult—70 kgm.

Infant—10 kgm.

Fig. 3. Enclosed square represents mass of water lost from severely dehydrated infant and adult in relation to total mass of subject.

child back to a normal state of fluid composition.

For practical purposes, then, inasmuch as we have no rapid laboratory test for determining the extent of the dehydration of the child at various ages, it is necessary for us to command into use our knowledge of the physiologic defects that are present, and to correlate these with the clinical manifestations which are indicative of what one might consider a moderate dehydration or a severe dehydration. It is particularly important that a differentiation between these two states be made clinically. The child that is suffering from a moderate dehydration has made, and is making, quite satisfactory compensatory adjustments to the loss of water by whatever means it be occurring. Vital functions, particularly that of certain organs, the brain and the kidney, have not as yet been seriously impaired. To permit the dehydration to continue without the institution of proper therapy will lead to irreversable damage of these organs. On the other hand, the recognition of the state of severe dehydration in the young infant is of great importance, and the condition should be dealt with as an emergency situation. Under these circumstances the physiologic compensatory mechanisms have now exceeded their limits. Organ damage due to lack of oxygen because of reduction of the blood flow and hemo-concentration of the blood itself, the influence of toxic factors associated with the infection, and the influence of tissue breakdown and the metabolites occurring thereby, are affecting the liver, brain, kidney, and the heart profoundly.

The child with a moderate dehydration usually presents the following clinical signs. There is irritability, the skin is dry, the lips are dry, the mouth mucous membranes are still somewhat moist, the tongue is usually coated, the skin of the axilla and the groin and that of the palms of the hands and the soles of the feet are still moderately moist. In other words, rather careful general inspection of the child at the time of admission will reveal that he is suffering from a moderate deprivation of water, but that he is making quite satisfactory circulatory and excretory compensatory responses. If urine is obtained it is usually found to be of a high specific gravity and low in volume. More important, however, because of the difficulty of obtaining urine, is the history by the mother that the child has not voided as frequently in the past 24 hours as it had usually been doing. The hemoglobin, the plasma protein, and the hematocrit are usually normal. If, however, the deprivation of water has been associated with a loss of basic ions in a diarrhea, or with excessive vomiting, there is no significant change in the solid elements of the blood until the interstitial reservoir has been depleted considerably. On the other hand, when there has been no electrolyte loss, and only a loss of water, then the hemoglobin, the hematocrit, and the plasma protein soon become elevated, after initial compensatory responses. The moderately dehydrated child may present fever either from the infection that precipitated the dehydration or, at times, may present fever, particularly in warm weather, due to the dehydration itself. Irritability is moderate to marked. When offered water the infant will usually take some, but only in small amounts. At times, when given in large amounts the child may vomit.

The clinical description of the infant with severe dehydration is usually as follows. Here the skin now becomes ashen. It is dry and leathery and sometimes mottled, an indication of peripheral circulatory failure. At times, the skin is so dry that it lies in folds, particularly about the buttocks and in the groin and under the arm. The eyes are deeply sunken, presenting a highly toxic appearance. Instead of irritability, apathy is present. The child may present the picture of having meningeal involvement, with stiff neck and assuming an opisthotonic position. The mucous membranes of the mouth are dry and contain thick mucoid saliva. The lips are dry and parched. The skin of the palms of the hands and the soles of the feet and the skin of the axilla and the groin are usually dry and do not feel moist or velvety to the touch. Anuria is usually present, or a history of the child not having voided for many hours previous to admission is obtained.

The hemoglobin, the hematocrit, or the plasma protein are usually increased to a higher value, indicative of hemo-concentration. In the majority of these infants, regardless of the mechanism that produced the severe state of dehydration, the blood urea nitrogen is increased, an indication of extra-renal uremia.

Under these clinical points for the estimation of a moderate or severe dehydration and the return of the body weight to normal during a rehydration procedure, information was obtained as to the amount of weight that had been lost during the dehydration phase. Thus, infants under the age of three with a severe dehydration were found to have lost 15 to 20 per cent of their body weight, while those over the age of three had usually lost between 8 and 10 per cent of their body weight. When a moderate dehydration was present, infants under the age of three had lost between 10 and 12 per cent of their body weight, and those over the age of three had lost 4 to 6 per cent of their body weight. (Figure 4.)

Age	Moderate Dehydration Per Cent Weight Loss	Severe Dehydration Per Cent Weight Loss
B–3	10–12	15–20
3–10	4– 6	8–10

Fig. 4. Average amount of weight loss by infants and children suffering from dehydrated states.

An approximate quantitative evaluation to the problem of dehydration obtained in this manner serves to give us some general values that may be used to rehydrate a child who is in a state of dehydration. It is first necessary to evaluate clinically the degree of dehydration from the clinical state and the age of the child. It is then next necessary to determine from the history, and from the nature of the disease, the type of dehydration that is occurring. That is, is it due to salt and water loss such as would occur with a diarrhea, or is it due primarily to water deprivation from excess losses of water in itself or from a failure to administer a sufficient amount of water during the course of the illness? Third, from the age of the child we must calculate the amount of fluids required to rehydrate. For practical purposes, Figure 5 presents values which may be used to calculate the amount of fluid that should be given the child when he shows either a moderate or a severe dehydration, and

Birth 3 Years 15 Years
Moderate Dehydration
75 cc./kilo | 50 cc./kilo
Severe Dehydration
125 cc./kilo | 100 cc./kilo

Fig. 5. Amounts of fluid required to rehydrate infants and children as determined by the clinical type of dehydration.

fourth, in order not to neglect the 24-hour requirement of the child, one must further bear in mind the need for the administration of an additional amount of fluid that is equal to the total 24-hour requirement of the child under normal circumstances. Figure 6 presents these values in a condensed form. Thus, the sum of the amount of fluid required to rehydrate the child plus the amount of fluid required to maintain the normal fluid requirement equals what might be considered the "theoretical objective" if such could be obtained practically. A sample calculation for the "theoretical objective" is as follows:

Age	Water per Kilogram per 24 Hours
Birth–1	150–125 cc.
1– 3	125–100 cc.
3– 6	100– 75 cc.
6–10	75– 50 cc.
10–15	50– 40 cc.

Fig. 6. Approximately 24-hour requirement of water for a healthy child.

Example: 10 kilogram severely dehydrated child.

Fluid to hydrate	10 x 125 =	1250
Fluid to maintain next 24 hours	10 x 150 =	1500
"Theoretical objective" Total		2750 cc.

Obviously when one is confronted with the difficulties of administering 2,750 cc. of fluid to a child weighing 10 kilograms, particularly when such must be given by the parenteral route, the obstacles to such a procedure seem to be insurmountable. It is then necessary to establish what might be called a "practical objective." This is obtained by reducing the total daily 24-hour requirement to about one-half of its value. One is justified in doing this for the following reasons. When good rehydration procedures are established and urine flow follows, the kidney is then usually able to make the normal compensatory adjustments by concentrating the urine in the face of a diminished fluid intake, and thus maintaining the proper fluid content of the body once it has been hydrated. Thus, the practical amount of fluid that can be given is as follows:

Practical Objective

To rehydrate	1,250
To maintain hydration next 24 hours	750
Total	2,000 cc.

The rate of administration of the fluids intravenously must be determined by evaluation of the general clinical conditions of the infant or child. The rate of injection should not exceed the following:

Normal	5–10 cc. per minute
Dehydrated	10–15 cc. per minute
Debilitated, toxic or febrile	5 cc. per minute or less
Incipient shock	10–20 cc. per minute
After hydration	3– 6 cc. per kgm. per hour

Only in exceptional circumstances should the volume given at this rate exceed that of 6 per cent of the body weight. If continuous intravenous fluid therapy is given the rate should not exceed 3 to 6 cc. per kgm. per hour after the establishment of hydration. It is necessary that the amount of fluid that is to rehydrate the child be given rather rapidly, if possible within the first 12-hour period. It is also advisable to give at least one-half of this fluid intravenously within the first 12-hour period. The amount of fluid required to maintain the hydration can be given over the next 24-hour period. In other words, between 30 and 36 hours are required to administer this volume of fluid if all of it must be given parenterally.

Clinical judgment, however, must still be exercised. When the diarrhea persists or the fever continues elevated, it is necessary then to give even a greater amount of fluid. Many times when a severe state of dehydration is present the degree of anuria may be extreme. One may then give plasma or whole blood intravenously in order to restore, if possible, the circulating volume to normal. It is sometimes advisable to give whole blood or plasma immediately following the fluid initially given to rehydrate the child. This assures more rapid absorption of the fluid given subcutaneously, and seems to facilitate a re-establishment of urine flow.

From a qualitative standpoint several important facts must be emphasized. In almost any child with a moderate or severe dehydration there is a certain degree of ketosis. This is due to the limited reserves of glycogen in the liver and in the muscle tissue associated with a greater oxygen demand of the tissues of the younger infant. Thus, to dissipate the further production of ketone bodies and to provide carbohydrate for energy production, glucose should always be given. Whatever specific fluid is given to correct the metabolic defect of either an acidosis or an alkalosis, glucose should always be present in this solution. The specific fluid is determined by the presence of either an acidosis or an alkalosis. If an acidosis is present in a moderate dehydration, it is advisable to give sodium chloride or a Ringer-lactate solution. Here these two solutions, plus an added 5 per cent of glucose, are usually adequate to correct the mild degree of acidosis and to restore the depleted electrolyte balance of the body. On the other hand, when a severe dehydration and an acidosis exist, it is advisable to use the more specific basic solution, particularly sodium lactate or sodium bicarbonate. A 1/6 molar solution of sodium lactate or a 1.5 per cent solution of sodium bicarbonate is approximately isotonic with blood. It is advisable, however, to determine in the severe state of acidosis and dehydration the carbon dioxide combining power of the blood. Under these circumstances the following accepted calculation will be of value in determining the amount of fluid required to correct the specific acidosis.

> (60–CO_2 combining power) 1.8 body weight (kgm.) = Number of cc. of 1/6 molar racemic sodium lactate or of 1.5 per cent $NaHCO_3$ required to raise the CO_2 to 60 volumes per cent.

When it is not possible to do a carbon dioxide combining power of the plasma, one may assume that at least a fall of 15 volumes per cent has occurred, and safely administer this amount of fluid. The respiration, clinical condition of the child, and the change in the acidosis for the better will give one an evaluation as to whether or not a sufficient amount of the specific sodium lactate or sodium bicarbonate solution has been given. This calculation, then, is as follows:

> For each 10 kgm. body weight: (60–45) 1.8 x 10 kgm. = 270 cc. of 1/6 molar sodium lactate or 1.5 per cent sodium bicarbonate.

When alkalosis is present, the approach must be less specific as unfortunately no specific acid solution has as yet been designed which can be given intravenously in a safe manner. One must then rely upon the administration of an adequate amount of fluid containing glucose either as sodium chloride or a Ringer-lactate solution in order to permit the restoration of kidney function, which in turn, will eventually correct the alkalosis by the excretion of the basic ions and the re-absorption of the acid ions from the kidney tubule.

A summary example of a planned approach to the quantitative and the qualitative aspect of dehydration is presented.

A 10 kgm. child with severe dehydration, due to diarrhea, has a carbon dioxide combining power of 30 volumes per cent. Suggested planned procedure as follows:

(a) Fluid required to rehydrate:
  10 x 125 .... 1,250 cc.
(b) Fluid required to maintain hydration:
  10 x 75 .... 750 cc.
  Total 2,000 cc.
(c) Specific treatment to correct acidosis:
  (60–30) 1.8 x 10 kgm. = 540 cc. of 1/6 molar racemic sodium lactate or 1.5 per cent sodium bicarbonate.
(d) Method of Administration:
  (1) On Admission:
    Sodium lactate or sodium bicarbonate (5 per cent glucose added) Intravenously .... 250 cc.
    Sodium lactate or sodium bicarbonate (5 per cent glucose added) Subcutaneously .... 290 cc.
    540 cc.
  (2) In Six Hours:
    Sodium chloride or Ringer-lactate (5 per cent glucose added) Intravenously .... 250 cc.
    Sodium chloride or Ringer-lactate (5 per cent glucose added) Subcutaneously .... 250 cc.
    500 cc.
  (3) Twelve to Twenty-four Hours:
    5 per cent glucose only, subcutaneously .... 1,000 cc.
  Total in 30 to 36 Hours 2,030 cc.

Once hydration is achieved and it is necessary to continue the parenteral administration of fluids, an excess of sodium chloride should be avoided. Usually 2 or 3 grams of sodium chloride per day will meet the average daily requirement.

Plasma and whole blood should be given intravenously soon after the rehydration procedure has been started and the acidosis partially corrected. Amino acids are also of value given either intravenously or subcutaneously. In severe states of dehydration and acidosis, considerable loss of nitrogen and potassium from the tissues has occurred. Following the emergency procedures for shock the addition of amino acids to the solutions should aid in restoration of the lost nitrogen of the body.

When specific chemotherapeutic agents are indicated, such as sulfonamides, these may be given parenterally in the solutions used for rehydration and correction of the acidosis. However, it is advisable to administer a single dose only, calculated to produce a satisfactory blood level, and then to wait until urine formation begins. The maintenance dose may then be given as long as adequate excretion of urine is occurring.

Most cases of severe dehydration are associated with an extra-renal uremia as indicated by the elevated blood urea nitrogen, and several days may pass before the blood level has returned to normal.

Failure of success in the treatment of the dehydrated infant or child may be attributed to several common errors. These are: failure to recognize that the child is dehydrated; failure to hydrate adequately when it is recognized; failure to maintain hydration once it has been satisfactorily treated; and failure to plan a quantitative and qualitative objective. Finally, the administration of sulfonamides and other drugs to a patient with oliguria or anuria may seal the fate of the child due to further kidney damage.

Only by knowledge of those conditions which tend to produce dehydration in infants and children, and early recognition of the state of dehydration, can adequate prophylactic measures be instituted in order to prevent the serious metabolic disorders that follow loss of fluid from the body.

The active treatment of dehydration, alkalosis, and acidosis demands *quantitative* knowledge of the extent of the disorder, and thus quantitative replacement of specific fluids necessary to restore the body water to normal relationship of volume and composition. This treatment should be an emergency, and should be continued as long as those factors which entered into the production of the disorder exist.

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Hypoglycemia Associated with Hyperplasia of the Islets of Langerhans:

Report of a Case Successfully Treated by Surgery

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Hypoglycemia is a condition resulting from the dysfunction or pathological changes in the liver [1] or in the organs of internal secretion concerned with carbohydrate metabolism, including the pancreas,[2] adrenals,[3] thyroid,[4] and pituitary.[5] Hartmann and Jaudon [2] indicated the multiplicity of the types of hypoglycemia with the following table:

Table 1
Classification of Hypoglycemia

- I. True Hyperinsulinism (insulin excess):
  - A. Hyperactivity of islands of Langerhans:
    - 1. Physiologic hyperactivity (induced by excessive carbohydrate intake).
    - 2. Hypertrophy or hyperplasia (compensatory or pathologic).
    - 3. Tumor
  - B. Insulin Administration.
- II. Relative hyperinsulinism:
  - A. Lack of dextrose precursor substances:
    - 1. Diminished absorption from gastrointestinal tract:
      - a. Starvation.
      - b. Loss because of vomiting, diarrhea, or fistula, with and without infection (combination of diminished food intake and increased metabolism).
    - 2. Liver abnormalities (decrease in glycogen stores or mobilization).
  - B. Lack of development or breakdown of regulatory mechanism:
    - 1. Normal newborn or premature infant.
    - 2. Endocrine imbalance: adrenal or pituitary insufficiency.
    - 3. Intracranial injury.
    - 4. Moribund state.
- III. Cryptogenic.

Hypoglycemia, due to whatever cause, is associated with more or less characteristic symptoms depending to a great extent upon the degree of subnormal blood sugar concentration. A great variety of symptoms may occur in patients with moderately low blood sugars. Symptoms of the severe degrees of hypoglycemia, however, are more constant. There may be recurring periods of mental lapses, unexplained attacks of unconsciousness, muscular twitchings, and often convulsions.

While hypoglycemia may be due to disease of the liver and a number of endocrine glands, it most often occurs with a disturbed secretion of the pancreas.[6] Disease of the above-mentioned organs should, of course, be ruled out before focusing all attention on the pancreas. Functional pancreatic adenomas and diffuse hyperplasia of the islets of Langerhans must be extremely rare in infants and children since only a very few have been reported in the literature. Table 2 summarizes the pertinent findings of the two published cases of pediatric hypoglycemia treated by pancreatic resection, together with our own case reported below.

Hartmann has proposed the following criteria before submitting a patient with persistent hypoglycemia to surgery:

1. There should be proof of a more or less persistent or a frequently recurring hypoglycemia by actual blood analysis by a suitable method.
2. It should be shown that the symptoms expected to be relieved by surgery can be relieved by dextrose administration.
3. It should also be shown that the symptoms cannot be relieved by conservative measures of diet regulation.
4. In the case of recurrent attacks of hypoglycemia with normal intervals between attacks, it should be shown that one is not dealing with the insulin intolerant or hypersensitive type due to the lack of opposing secretions.

Our patient fulfilled only the first three of these four criteria. To date we are not convinced of the validity of No. 4. Our infant was extremely insulin sensitive, which we believe is part of the hyperinsulinism picture. Schneider and Ancora,[9] in presenting two adults with hypogly-

Table 2
Pediatric Cases of Hypoglycemia Treated by Pancreatic Resection

Case	Reported by	Age	Duration of Symptoms	Symptoms	Minimum Blood Sugar	Operation	Pathology	Result
1.	Graham & Hartmann[7]	11 mos.	9 mos.	Convulsions	6 mg. %	80-90% resected	Normal pancreas	Symptom free 4 years; mentally deficient
2.	Callaway[8]	8 yrs.	Over 1 yr.	Fainting spells and convulsions	23 mg. %	75-80%	Hyperplasia of Islets of Langerhans	Symptom free 7½ years
3.	Present case (1947)	4½ mos.	2½ mos.	Convulsions	18 mg. %	65%	Hyperplasia of Islets of Langerhans	Symptom free 8 months

cemia symptoms due to proved adenomas in pancreas, came to similar conclusions, namely, that these patients are extremely sensitive to insulin. We also agree with these writers that a persistently low fasting blood sugar, usually below 50 mgms. per cent, strongly supports the diagnosis.

When one has proved to his own satisfaction, using the criteria described above, that one is dealing with an adenoma or hyperplasia of the Islets of Langerhans, surgery is in order. The following is the report of a case of hypoglycemia due to hyperinsulinism in an infant, age 2½ months, who was operated on with complete recovery.

Case Report

This 2½-month-old female infant was admitted to Northwestern Hospital for the first time on July 5, 1946, because of fainting attacks of 3 weeks' duration. The baby had two nearly identical episodes characterized by uttering a sudden cry while at rest and by the time the mother reached the crib the child was unconscious, mottled, limp and breathing rapidly. For the following 24 hours the baby acted stuporous. At no time did she have a convulsion, hyperthermia, history of cerebral trauma, or any apparent infection. After the first "spell" her general activities were subsequently normal until she had her second seizure four days before entry. Both of the attacks occurred after 4:00 P.M. and just before the 5:00 o'clock feeding.

Past History: The patient was born at full term by normal delivery after five hours of an easy labor. The pregnancy had been uncomplicated. There were no neonatal convulsions, cyanosis or fainting spells. The infant displayed only a slight jaundice on the first day of life. After a few days of unsuccessful breast feeding the baby was put on a pasteurized whole milk formula with adequate vitamin supplements. Until the immediate illness, there was a steady weight gain, no contagious diseases and general wellbeing.

Family History: The father and mother enjoyed good health. Two siblings, a girls 7 years old and a boy 5 years old, had always been well. A maternal uncle and the maternal grandmother had diabetes but the mother had never had any diabetic symptoms. The mother's blood sugar levels and urinary sugar analyses had always been normal.

Physical Examination including a complete neurological examination was negative.

Laboratory Data: During her 10 days in the hospital, numerous laboratory and X-ray studies were carried out. Lumbar puncture and bilateral subdural taps were negative. Skull and long bone X-rays were normal. Blood Wassermann was negative. Both the mother and the patient were Rh positive. Urine analyses and blood counts were normal. Blood neutralization studies against toxoplasma organisms, the viruses of Western equine encephalomyelitis, lymphocytic choriomeningitis, and St. Louis encephalitis were negative. Serum calcium: 12.7 mg. per cent. Serum phosphorus: 7.4 mg. per cent. Fasting blood sugars were 33, 85, 68 and 64 mg. per cent. Table 3 indicates the blood sugar responses in pre- and postoperative oral glucose tolerance tests.

Table 3
Glucose Tolerance Tests (micro method)

Preoperative		*Postoperative*	
Time	Sugar	Time	Sugar
Fasting	54 mg. %	Fasting	58 mg. %
1 hour	110	1 hour	104
2 hour	28	2 hour	42
3 hour	36	3 hour	46
4 hour	36	4 hour	46

Table 4 indicates the blood sugar responses in pre- and postoperative insulin tolerance tests.

Table 4
Insulin Tolerance Tests (macro method)

Preoperative		*Postoperative*	
Time	Sugar	Time	Sugar
Fasting	81 mg. %	Fasting	71 mg. %
20 minutes	25	20 minutes	28
40 minutes*	18	40 minutes	33
60 minutes	29	60 minutes	44
120 minutes	20	120 minutes	62

*Patient drowsy between 20 minute and 40 minute specimens.

On the basis of the above studies, the patient was discharged home on a whole milk formula strengthened with protein and fat. No "spells" had been observed during the period of hospitalization.

Readmission History: On August 26, 1946, at the age of 4 months, the patient was readmitted for further study. During her 6 weeks at home, the ingestion of her protein-fat enriched formula had been associated with frequent loose and frothy stools. Weekly non-fasting blood sugars had ranged from 64 to 85 mg. per cent. During her first week at home she had a single "spell" characterized by sudden cry, upward rolling of her eyes, limpness and drowsiness. During the few days before re-entry she had several attacks associated with profuse perspiration, generalized jerkings of the extremities, drowsiness and finally total limpness. The most severe of these occurred the day before entry.

There were no abnormal physical findings on the second admission.

Hospital Course and Laboratory Studies: Fasting blood sugars over the next three days gave readings of 39, 43, and 55 mg. per cent. The results of a preoperative adrenalin tolerance test were: Fasting 55 mg. per cent; ½ hour 162 mg. per cent; 1 hour 185 mg. per cent; 2 hours 152 mg. per cent; and in 3 hours 57 mg. per cent. A pneumoencephalogram was negative. Following surgical consultation an exploratory laparotomy was performed on September 6, 1946, by Drs. Oswald S. Wyatt and Tague Chisholm. The pancreas was palpated and visualized for its entire length but no discrete adenoma was seen or felt. Approximately 65 per cent of the pancreas was removed together with the spleen.

Pathology Report: The specimen consisted of a segment of pancreas measuring 4 x 2 x 1 cm. and weighing 20 gm. In addition, there was a small not unusual appearing spleen. Serial sections through the pancreas failed to reveal any adenoma. Microscopically, representative sections from the pancreas displayed an increase in the number of islets of Langherhans, most of which were normal in size but some of which were hyperplastic.

The ducts and exocrine parenchyma appeared entirely normal. Spleen sections were not abnormal.

Postoperative Course: After the pancreatic resection, the baby had an uneventful recovery. The wound healed by first intension. Fasting blood sugars on three occasions between the fourth and the fourteenth postoperative days were 69, 58, and 71 mg. per cent. There was no transient hyperglycemia nor glycosuria. Several stools were negative for fat. She was discharged home on the fourteenth postoperative day.

Follow-up: The patient has been carefully studied during the past eight months since surgery, and she has made excellent progress. She has had a weight gain from 11 lb. 14 oz. at the time of her second hospital discharge to 19 lb. 12 oz. at present. She has a robust appetite and normal activity. She appears alert and healthy. She is inclined to be constipated and has never shown fatty stools. Sugar has not been present in her urine on any examination. On only a single occasion, eight days after discharge from the hospital, did she exhibit mild symptoms suggestive of hypoglycemia; a blood sugar during this "spell" was 131 mg. per cent. Three other nonfasting blood sugars up to the present have been 160, 91, and 107 mg. per cent.

COMMENT

That severe hypoglycemia attacks may have serious consequences is clearly brought out by Baker,[10] whose clinical and experimental investigations show that extensive and irreversible cerebral damage may result from recurrent or prolonged hypoglycemic attacks. It is therefore obvious that early diagnosis and treatment of hypoglycemic attacks are of utmost importance.

When the various causes of hypoglycemia have been ruled out and the diagnosis of hyperinsulinism arrived at, one should keep in mind the work of Brunschwig,[11] who emphasizes that a partial resection of the pancreas in hyperinsulinism is probably as valueless as partial resection of the thyroid in hyperthyroidism and emphasizes by analogy the importance of doing a subtotal pancreatectomy.

SUMMARY

1. We have reported a case of severe hypoglycemia due to overactivity of the islets of Langerhans in a 4½-month-old infant, with recovery following a subtotal pancreatectomy.

2. The pathologic specimen showed hyperplasia of the islets of Langerhans.

3. The early diagnosis and treatment is urged to avoid serious neurological sequellae.

We are indebted to Dr. Erling S. Platou and to Dr. Oswald S. Wyatt, for the privilege of reporting this case.

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BEHAVIOR CLINIC

A privately operated clinic for the treatment of emotionally disturbed infants and children up to age six opened its doors in New York City in February. Equipped to handle 50 youngsters, the Council Child Development Center had received applications for 110 prior to the opening. Children of all racial and religious groups will be admitted, and fees will be based on parents' ability to pay.

No attempt will be made to treat mentally retarded children, nor those with organic ailments; the center will confine itself to the guidance of apparently normal tots who crop up with behavior problems. A special team made up of psychiatrists, pediatricians, and psychologists, will carry out the program which includes the operation of a nursery school for observation purposes.

Financial support is being provided by the New York section of the National Council of Jewish Women, the estate of Lieut. Lester N. Hofheimer, and the Jewish Board of Guardians. The last-named organization directs and supervises the professional services.

The center is housed in a six-story building at 227 East Fifty-ninth Street. Guests of honor at the opening included Mrs. Franklin D. Roosevelt and Dr. Katharine F. Lenroot of the U. S. Children's Bureau.—*RN,* March, 1947.

Acute Intussusception in Infancy and Early Childhood

With a Review of Fifty-five Consecutive Cases

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Of all the critical conditions amenable to surgical treatment which may arise in the abdomen of the infant or the child, acute intussusception holds a position of first rank. This disorder is not a rarity in medical practice. Its prompt relief affords a dramatic recovery and its neglect too often occasions an unwarranted medical tragedy. Drawing from the experience of our last 55 consecutive cases of intussusception during the past five years we present the following review of intussusception in infancy and childhood with an eye to emphasizing its early diagnosis and to underscoring several aspects of the care in this condition. Only by bearing in mind some of these concepts can the mortality in this disorder be further reduced.

Intussusception has been variously termed invagination, introsusception and intussusception. It nearly always is associated with forward peristalsis and is descending in character, although occasional instances of the ascending type have been reported with reverse peristalsis.[1] As the name suggests the bowel is telescoped by invaginating the proximal segment of intestine into the distal adjacent segment; the inner core is termed the intussusceptum and the outer sheath the intussuscipiens. The process is usually single (47 cases out of our last 55), sometimes double (6 cases), and rarely triple. Multiple intussusceptions are extremely rare (2 cases).

The etiology of intussusception continues to remain obscure. Not a single demonstrable cause for this condition was observed in our entire series. Ladd and Gross[2,3] report that less than 5 per cent of their cases had a Meckel's diverticulum, an enteric cyst, or a polyp as the initiating cause of the process. Their figures are in keeping with Hogg and Donovan[4] who found no obvious explanation for the disturbance in 83 per cent of their 123 cases from 1927 to 1945. In a monograph based on 400 cases Perrin and Lindsay[5] offered the theory that stimulation of some character results in the hypertrophy of the normally abundant lymphoid tissue in the terminal 1 or 2 inches of ileum. In consequence the ileocecal valve protrudes abnormally far into the cecum and constitutes the head of the downwardly propelled intussusceptum. In strong support of this idea is the frequent appearance of enormously enlarged lymph nodes in the mesentery neighboring on the ileocecal valve.[6]

The commonly accepted classification of the different types of intussusception was originally suggested by Clubbe[7]: (1) enteric (3 cases out of our 55); (2) entero-colic (52 cases); and (3) colic. Our case distribution corresponds to the reports of others.[2,3,4] We have seen only a single colic intussusception in 20 years of pediatric surgical practice.[8]

That intussusception is primarily a disorder of infancy and early childhood is borne out by statistics from several sources. Ladd and Gross[2] had 87 per cent of their cases in children under 2 years of age with 70 per cent of them between the fourth and eleventh month of life. Hogg and Donovan[4] had 75 per cent of their cases between the ages of 3 and 11 months. And 45 of our 55 cases were under 2 years of age with 80 per cent of these between the third and the twelfth months. Most writers report a 2:1::male:female ratio; ours was 3:1. Elsewhere in the literature a total of five patients have been reported with a significant family history of intussusception in siblings or close relatives. One male infant in our group had had two older brothers operated upon for the same condition. Needless to say, such a mother is very astute in making the diagnosis herself.

The sequence of the pathologic-physiology in acute intussusception is orderly and progressive. As the head of the intussusceptum advances the mesentery undergoes a severe stretching. Many of the vessels become compressed—the veins first. This results in local congestion and edema. Up to this time the calibre of the intestinal lumen has been only partially compromised and reduction of the intussusception is not a difficult procedure. If reduction is not accomplished at this stage, increasing pressure shuts off the arterial blood supply; obstruction becomes complete; and necrosis of the devitalized bowel ensues. Depending upon many local circumstances this gamut can be entirely run in a very few hours (such cases present an early picture of shock) or may progress slowly over several days (these cases rarely exhibit shock symptoms). Spontaneous cures by sloughing the intussusceptum have been reported[9] but this method of management is hardly to be recommended.

The carefully elicited clinical history is so typical that the appropriately termed "telephone diagnosis" can be made with a surprising degree of accuracy. The mother commonly reports that her heretofore perfectly healthy, chubby infant was suddenly seized with exquisitely severe abdominal pain which was unlike any colic with which she had had any previous experience; that the pain was so severe that the baby screamed, became pale, perspired freely and even appeared in shock; and that this pain lasted a few minutes and disappeared as suddenly as it had begun.

If the shock element is not too severe, the patient may seem to derive some relief during the attack of pain by either assuming the knee-chest position or by lying flat on its back with its legs flexed on the abdomen. These paroxysms of pain tend to recur every 3 to 15 minutes with exact repetition of the previous symptom sequence. If the shock picture is not predominant, the baby commonly is well between attacks; otherwise he is left limp and exhausted. Bowel movements may occur during the first few seizures as the bowel becomes evacuated of its normal contents. Later the residual feces may be mixed with mucus and blood flecks or even accompanied by the passage of significantly large clots of fresh and slightly changed blood.

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Fifty of our 55 cases had classical attacks of colicky pain. Thirty-five babies became pale and perspired. Twenty-nine had melena and 26 had some vomiting. Forty of our cases came under our care in less than 24 hours; 22 of these in less than 12 hours. Of the other 15 cases, 7 were of less than 48 hours' duration and the longest had been going on for 10 days.

If seen early, the abdomen is normal in appearance and uniformly soft to palpation. When a mass is palpable (39 of our 55 cases had a palpable mass) it is typically firm, sausage-shaped and sometimes tender. This mass will be found at the head of the intussusception: most frequently in the right upper quadrant or epigastrium (78 per cent of our 39 palpable masses), at the splenic flexure, along the descending colon or in the pelvis. The right lower quadrant is often empty, constituting a positive Dance's sign. The rectal examination should never be omitted for the head of the intussusceptum may well be palpable in the rectal ampulla. Shelley[10] has emphasized the importance of a bimanual pelvic examination with the patient in the upright position to facilitate the palpation of the head of the intussusceptum in the sigmoid (2 of our cases were palpable by rectal). Only in one of our three cases of enteric intussusception were we able to palpate the tumor in the periumbilical region.

Some writers [2,3] have placed a great deal of stress on the admission temperature as a prognosticating sign, implying that high elevations usually accompany severe dehydration, bowel necrosis, toxin absorption and shock. To a certain extent this has also been true in our experience. Thirty-four of our cases entered with temperatures under 100° F.; 12 ranged from 100 to 102° F.; and 9 were from 102 to 105.6° F. Two of our four fatal cases had elevations above 104.6° F., yet four other cases with extremely high elevations were reduced with ease and recovered uneventfully.

In intussusception the mortality rate in all clinics has been significantly reduced over the past 25 years. Bolling [11] reported an overall figure of 30 per cent for The Babies Hospital in New York in 1923; Hogg and Donovan [4] now report 13 per cent for the same institution during 1945. Ladd and Gross [2] reported a drop from 59 per cent in 1912 to 14 per cent in 1938 at The Children's Hospital in Boston. These encouraging reports have largely been made possible by recent advances in the preoperative care of the patient. Although prompt treatment is imperative, adequate preoperative preparation constitutes just as important a part of good surgical management as the technical procedure itself. Three aspects of this stage of management warrant special mentions: (1) *Dehydration* should be adequately corrected by the administration of dextrose and salt solutions by the parenteral routes. (2) *Shock,* and especially incipient shock, should be combatted by the intravenous administration of plasma and/or blood. Often the veins are so collapsed that a canula needs to be inserted into an exposed vein or into the sternal or tibial marrow cavity. By such routes plasma and blood can run in continuously during the operative procedure. (3) *Gastric intubation* is of paramount importance. Before the patient goes to the operating room a naso-duodenal tube should be inserted; gastric lavage carried out; and the tube left in place during surgery to facilitate the intraabdominal exposure with the stomach deflated and to prevent aspiration of regurgitated intestinal contents while under anesthesia. If, after anesthesia, abdominal distention is excessive, the tube can be attached to suction.

Much has been written[12,13] on the non-operative treatment of intussusception, i.e., the reduction of the intussusceptum by air insufflation or barium or saline enemata. At best this mode of therapy is fraught with many dangers. The colon may fill in entirety yet an enteric intussusception may persist; the appendix may be significantly and irreversably damaged thus leading to necrosis and perforation; or the physician, resting securely with an evacuation film showing adequate reduction, may awaken later to find the process has recurred. Even in the hands of an experienced roentgenologist only a small percentage of cases are satisfactorily reduced with fluoroscopic control. Surgery is the method of treatment of choice, although we have felt that barium studies are many times helpful from a diagnostic point of view and occasionally from a therapeutic point of view. We have arbitrarily set up four major criteria, any one of which is sufficient to demand surgery and to by-pass barium studies: (1) if severe symptoms of shock exist, (2) if severe bleeding by rectum has occurred, (3) if there is an antecedent or family history of intussusception, or (4) if an X-ray film of the abdomen shows small bowel obstruction. In our series there were 14 such cases which went directly to surgery. Of our remaining 41 cases which were studied by barium enema only 25 per cent, or 10 cases, were satisfactorily reduced by this means. The other 31 cases were irreducible with conservative means and required surgical intervention. It can not be emphasized too strongly that every case which appeared relieved by non-surgical means was kept in the hospital 36 to 48 hours while the temperature and leukocyte counts were carefully followed for evidence of recurrence or complications.

The operative procedure has now become standard among men doing pediatric surgery. To maximize the conservation of body heat the extremities are wrapped in sheet wadding. A safe general anesthetic is administered. Thirty-six of our cases received only ether by the open drop method; 6 were inducted with vinethene and carried with ether; 2 received only cyclopropane and oxygen; and 1, cyclopropane with oxygen by mask and D-Tubo curarine by vein. The right midrectus muscle splitting incision is generally employed (this was used in all of our 45 cases). With extreme gentleness the intussusception is reduced by milking the head of the intussusceptum backwards out of its sheath. Occasionally the neck of the intussuscipiens must be stretched digitally to permit the final delivery of the head. The viability of the appendix and any other involved intestine is then assessed while warm moist pads are repeatedly applied. Of our 45 cases which came to surgery 3 intussusceptions had reduced spontaneously under anesthesia; only 2 required resections with repair being carried out by end-to-end anastomosis; and 40 were reduced by persistent gentle taxis. Of these last 40 cases 13 had appendectomies because of significant grossly evident damage to the appendix and upon microscopic examination 11 of these appendices were distinctly pathological and severely deranged. After returning the viscera to the peritoneal cavity the wound is most carefully closed in layers. We used catgut throughout except for silks to the skin.

The postoperative course in most cases of intussusception is remarkably uneventful. Temperature rises from 101 to 104° F. are common on the first few postoperative days, presumably due to the absorption of toxic by-products from the damaged bowel. Thirty-four of our 45 cases exhibited hyperpyrexia for one to four days after surgery. A very few patients have loose, frequent and occasionally foul smelling stools (3 cases in our series). Because of the reportedly high incidence of wound disruption in this condition these patients are usually restrained on their backs for a week, thoroughly sedated and given daily parenteral vitamin C. Fortunately we have had only a single eventration among our 45 operated cases. Clinically significant ileus with obstruction occurred in three of our patients but was brought under control by conservative measures. Five of our operated cases developed severe respiratory infections with one serious pneumonia.

We have been very fortunate in having only 4 deaths in our series of 55 cases of acute intussusception, a mortality of 7.2 per cent. Both of our resections with end-to-end anastamoses survived and did well. Two of our deaths occurred in infants who were extremely toxic and in poor condition. The other two deaths occurred from a few minutes to a few hours after surgery in infants who were not extremely ill. Only one of these was examined at autopsy and no adequate explanation of the mode of death was detected.

Summary

1. Acute intussusception constitutes a surgical emergency in infancy and in early childhood. Most cases occur between the third and the twelfth month of life.

2. The diagnosis can usually be made on the basis of a classical history of intermittent severe seizures of abdominal pain, of a palpable sausage-shaped mass in the abdomen, and of bright red blood in the feces.

3. The barium enema is frequently a helpful diagnostic weapon and sometimes a successful therapeutic weapon. When employed therapeutically its dangerous shortcomings must be carefully recognized to avoid unwarranted medical tragedies.

4. Surgical intervention constitutes the treatment of choice. Carefully supervised preoperative care can not be overemphasized in importance. The correction of dehydration, the combat of shock, and the intubation of the stomach before surgery—are stressed as equally important as prompt surgery itself.

5. Data from 55 consecutive cases of intussusception are presented to emphasize the importance of early diagnosis and of adequate and prompt treatment as the only means of reducing the existing mortality.

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METHOD FOR IDENTIFICATION OF NEW-BORN

To prevent tragic mixups in babies, Dr. Malcolm A. Hyman of Brooklyn suggests complete typing of the newborn's blood. Footprinting has not been completely successful for the prints blur and when the child is a month old the footprint changes completely. Dr. Hyman also suggests that blood be collected from the newborn umbilical cord, placed in a corked tube, and attached to the mother before the child leaves her. If future doubt arises a new sample can be taken and compared.—*R.N.*, March, 1947.

Tracheotomy in Bulbar Poliomyelitis*

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At the Minneapolis General Hospital during the 1946 poliomyelitis epidemic it has been possible partially to estimate the value of tracheotomy in poliomyelitis patients having respiratory difficulties. Prior to this epidemic the members of the otolaryngology staff had had no experience with tracheotomy in poliomyelitis. Using the few published reports as a guide, tracheotomy has been employed cautiously. As the epidemic has progressed the indications have become clearer. This report is made with the hope that a summary of our experiences may be useful to others. Background literature will be briefly reviewed.

Galloway[1] reported 3 patients who had respiratory difficulty as a complication of poliomyelitis. In 2 of his patients he believed tracheotomy was a life-saving factor. In one patient Galloway observed a pool of fluid in the pharynx with its gravity level in the larynx and trachea. In his other cases, thick mucus was aspirated when the trachea was opened. Galloway concludes with the statement that "emphasis in poliomyelitis with respiratory difficulty may well be shifted to the peripheral respiratory tract. Postural drainage, aspiration, and use of the respirator should be given a fair trial. If these are not successful tracheotomy may be employed as a life-saving measure . . ."

In a comprehensive review of poliomyelitis, Davison[2] states that tracheotomy may be necessary in bulbar poliomyelitis.

Wilson[3,7] emphasizes that occasionally tracheotomy is a life-saving procedure. He states that he had been convinced repeatedly of the wisdom of employing the procedure. He believes that tracheotomy is indicated in less than 1 in 10 cases of bulbar poliomyelitis, and in "only some of those with extensive pharyngeal paralysis." He emphasizes that "when a high-strung patient cannot relax and when the mere process of aspiration so frightens him that it increases pharyngeal secretion and initiates a vicious circle, a tracheotomy may bring about as dramatic relief as we see in laryngeal diphtheria, and the patient may sink into a deep sleep of exhaustion."

Glaser[4] describes the use of a positive pressure oxygen system connected to the patient's trachea by a tracheotomy tube. The positive pressure in the tracheotomy makes expiration through the tube impossible. The author believes that the expiratory blast forces the patient's pharyngeal secretions away from his larynx. The secretions can then be removed from the pharynx by aspiration or drainage. Presumably the trachea and bronchi could also be cleared of secretion by periodic aspiration through the tracheotomy tube. Glaser reports one recovery and one death with his method. All bulbar cases not so treated in the same epidemic died. The group was too small to be statistically significant.

Nelson-Jones and Williams[5] reported the case of a dental officer with dyspnea due to pharyngeal and laryngeal paralysis and aspiration of secretions. Tracheotomy provided immediate relief of the laryngeal stridor. Aspiration cleared the bronchi of secretions and the patient ultimately recovered.

Durand[6] emphasized that drowning rather than paralysis causes death in many bulbar cases. He cited recoveries after placing nearly moribund patients so that heads were low and faces were down to permit gravity drainage of pharyngeal secretions.

At Minneapolis General Hospital, criteria for tracheotomy have gradually emerged as the epidemic has progressed. All bulbar cases do not need tracheotomy. A great many patients recover without it. Choosing the patient who may need it is exceedingly difficult.

The bulbar patient who has pharyngeal paralysis severe enough to allow spilling over of secretion into the larynx and trachea is a candidate for tracheotomy only when he cannot clear his own airway or when the airway cannot be cleared for him by pharyngeal aspiration and postural drainage.

Inability of the patient to clear his own airway is indicated by recurrent cyanosis, coarse bubbling rales in the chest, stridor and inability to cough efficiently. In excited patients who are unmanageable and in stuporous patients these symptoms are particularly significant. Direct laryngoscopy may demonstrate pooling of mucus in the pharynx, paralysis of one or both cords, and diminished tactile sensitivity of the laryngeal mucosa.

Aspiration bronchitis and pneumonitis, anoxia and fatigue are the conditions to be minimized by keeping the airway clear. We have had several experiences which have demonstrated to our satisfaction that gross amounts of pharyngeal secretion and food do enter the trachea, and cannot be evacuated by the patient. Upon opening the trachea in one of our early patients thick, gray liquid welled up into the wound. After this had been aspirated and the operation completed the wound filled again. The patient's anoxia decreased and his condition improved immediately when his airway was finally cleared. Similar conditions have occurred 5 times in our 22 tracheotomies.

When the bulbar polio patient coughs or is cyanotic after eating or drinking the entrance of food into the respiratory tract must be suspected. This was dramatically illustrated by a 7-year-old girl whose eating was observed 6 weeks after tracheotomy. This operation had been done because of flaccid vocal cord paralysis, laryngeal stridor and recurrent anoxia. The patient also had had the usual bulbar symptoms of nasal speech and dysphagia. At the time the child's eating was observed, she had recovered sufficiently so that she swallowed very well considering the extent of her original pharyngeal paralysis. The child happened to be drinking chocolate milk when we watched her. Enough spilled over into her airway so that the nurse aspirated it through her tracheotomy tube and chocolate stained the dressing around the tube. Such spillage occurred with each feeding. It seems inconceivable that this child could have escaped serious pulmonary involvement during 6 weeks of laryngeal paralysis without tracheal aspiration. Tracheal aspiration could only be provided in such a case by tracheotomy or repeated bronchoscopy. Such bronchoscopy is obviously not practical. It should be emphasized that according to competent pediatric opinion there is almost 100 per cent recovery of the pharyngeal muscles if life can be preserved through the first week of the disease.[3]

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Read as an inaugural thesis at the Minneapolis Academy of Medicine November 18, 1946, by Dr. Priest.

Certain defense mechanisms which either normally bar the entrance of foreign substances into the trachea or aid in the eviction of such material are rendered impotent in some cases of poliomyelitis. The defenses in question are: Normal vocal cord movement and normal sensitivity of the laryngeal mucosa. Motor paralysis of the larynx was observed in 5 of our cases. Intralaryngeal anesthesia was demonstrated in 1 case. These conditions may have existed undiagnosed in other cases. As is indicated later in the discussion, we did not employ direct laryngoscopy or bronchoscopy freely because they seemed to carry considerable risk in very weak patients. Laryngoscopy is necessary if knowledge of the exact state of the larynx is desired.

When the motor innervation of the larynx has been damaged the exact position of the paralyzed cords varies. This is what one would expect because of variability in the destruction of vagus nucleus cells which govern abduction and adduction. In our 5 cases in which cord paralysis was demonstrated by laryngoscopy, 2 had bilateral paralysis with the cords nearly in contact in the midline on inspiration. The cords were blown apart on expiration. Another patient had total paralysis of one cord. This cord lay in the midline. The patient could abduct the other cord only feebly. The remaining 2 patients had weak adductor muscles on one side and therefore coughed inefficiently.

Coughing is normally carried out by bringing the vocal cords together in the midline, building up positive intrathoracic pressure, suddenly abducting the vocal cords and allowing the expiratory air blast to carry foreign material out of the trachea. Patients having only one weakened or paralyzed cord cough inefficiently. Those having bilateral cord paralysis cannot cough with any degree of effectiveness. Decreased sensitivity or total anesthesia of the larynx superimposed on an already damaged cough mechanism greatly increases the vulnerability of the trachea. We have encountered intralaryngeal anesthesia sufficient to permit direct laryngoscopy and bronchoscopy of conscious patients with little discomfort. Laryngeal anesthesia in poliomyelitis has been described by others.[8]

Patients having bilateral flaccid cord paralyses are usually unable to breathe deeply because their cords are pulled together by air entering the lungs during inspiration. This has been likened to the action of an old-fashioned pair of cellar doors.[9] As the cords are pushed downward by the inspiratory air stream the cord edges come nearer to one another and the glottic opening is narrowed. Continued breathing through a narrowed glottis can be carried out. Such breathing must be pathologically shallow to prevent asphyxia, because each really deep inspiration shuts off the airway. Such a fine degree of respiratory control is difficult or impossible in the excited, weakened polio patient with a damaged respiratory mechanism. Entrance of secretion into such a larynx is disastrous in a poliomyelitis patient.

Transient anoxia is common in bulbar poliomyelitis patients. Weakness, fatigue, accumulation of secretion in the airways, and the toxicity resulting from the illness combine to hinder proper aeration of blood with resultant cerebral anoxia. Just how much anoxia a particular patient's already-damaged brain can tolerate is hard to determine. We have observed children who responded well and appeared not to be seriously ill at the onset of an episode of respiratory obstruction. These children then became cyanotic and never recovered consciousness although a few lived for several days. If tracheotomy would avoid even one of these severe anoxic periods in such cases it would seem to be worthwhile. The margin between life and death in these patients is so narrow that one such episode may kill them.

Direct laryngoscopy and bronchoscopy are not without danger due to the reduced viability of these patients. Normal patients tolerate the shock of these procedures, but weakened poliomyelitis patients may not. Experience has convinced us that tracheotomy may carry less risk than repeated bronchoscopy. Tracheotomy causes only slight shock and needs only to be done once, while bronchoscopy provides only temporary relief.

We have tried various types of continuous and intermittent pharyngeal suction using an inlying urethral catheter inserted through the nose. This catheter had multiple openings to prevent obstruction. Continuous suction in our experience has not been satisfactory except in a few instances. If one could use a closed system such as the urologist or the thoracic surgeon employs, continuous suction should be satisfactory. In the open pharynx one must move the catheter around to reach the secretion. We have found that the small, admirably-silent Stedman pump used by the urologists develops insufficient negative pressure for withdrawal of thick pharyngeal secretions. The usual water suction is extremely noisy and may be dangerous. We had one fatal accident when the water backed up and passed into a child's pharynx through the pharyngeal suction catheter. We finally came to use intermittent nasopharyngeal suction with the conventional type of portable electric pump despite the noise. Sometimes a nasal catheter was left in place and was moved about when aspiration was carried out. Leaving the tube in place spared the patient the discomfort of having it passed repeatedly.

The question of intubation with O'Dwyer tubes instead of tracheotomy has come up. In addition to the ever-present possibility that the O'Dwyer tube may be coughed up one cannot aspirate the trachea through this tube. Furthermore one is not dealing with a stenotic larynx through which one wishes to establish an air channel. The O'Dwyer tube would provide a narrower airway than is already present. Because the larynx is not stenotic the tube would probably not remain in place even as well as in acute inflammatory laryngitis. Furthermore laryngeal spasm would ensue in some patients. Consideration of these factors led us to reject the O'-Dwyer tube without trial.

The endotracheal tube used for anesthesia has also been rejected without trial. Such tubes might be practical if one were sure that they would be needed for only a short time. It would be obviously impossible to leave such tubes in place for weeks while awaiting recovery from pharyngeal paralysis.

Numerical data pertaining to our tracheotomized patients follow. Twenty-two patients from 4 to 34 years old were operated upon; 7 lived and 15 died. We believe that 5 of the survivors would have died without tracheotomy. Bulbar symptoms were present less than 4 days in all but one patient at the time of tracheotomy. Cyanosis was severe enough to be a significant factor in the decision to operate in 13 patients. The cyanosis was terminal in about one-half of this group. Five had vocal cord paralyses diagnosed by laryngoscopy. Eight had coarse bubbling rales over the chest. Ten patients were either disoriented and resisted aspiration violently or were stuporous and made no voluntary effort to rid themselves of secretions. We feel that we lost some patients by operating too late.

SUMMARY

Experiences at Minneapolis General Hospital with tracheotomy during the poliomyelitis epidemic of 1946 are analyzed. Using published reports as a guide, tracheotomy was employed cautiously. Surgical indications gradually became clear as the epidemic progressed.

Criteria for tracheotomy were: (1) Respiratory distress as evidenced by recurrent cyanosis, coarse rales in the chest and laryngeal stridor. (2) Excitement and unmanagability causing patient to resist pharyngeal aspiration strenuously. (3) Stupor of degree sufficient to make patient oblivious to accumulation of secretion in his airway. (4) Inability to cough effectively. (5) Pharyngeal pooling of mucus, vocal cord paralysis, or intralaryngeal hypesthesia demonstrable by laryngoscopy.

Twenty-two tracheotomies were done; 7 patients lived and 15 died. It is thought that the procedure was lifesaving in 5 cases. We feel that some patients died because we operated too late.

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STATES TIGHTENING ADOPTION LAWS TO CURB "BLACK MARKET IN BABIES"

At least 20 state legislatures now in session are considering extensive changes in their adoption laws and related procedures, the U. S. Children's Bureau, Social Security Administration, Federal Security Agency, reported recently. The Bureau's estimate of the number of states considering such legislation is based upon request for its advice on bills being drafted in line with its recommendations on adoption laws.

This action, said Katharine F. Lenroot, the Bureau's Chief, is a direct reflection of the public concern aroused through current revelations of the so-called "black market in babies," and represents an effort on the part of states to throw greater protection around children likely to be involved in these transactions. Most of such children, Miss Lenroot added, are of illegitimate birth.

Changes are contemplated not only in such laws, the Bureau added, but also in legislation affecting relinquishment of parental rights, licensing of child-placing services, and determination of guardianship and other matters.

A number of states are also considering changes in birth registration procedures in order to protect the child born out of wedlock, the Bureau added. More and more states are adopting the simple birth card that has on it only the name of the person, the place and date of birth, the race and sex. The complete record, on which the illegitimacy item appears, is safeguarded and is accessible only to those who may have a direct interest in the matter.

The Bureau's recommendations on these various matters, which are serving as a guide to much of the proposed legislation, are based upon a study of adoption laws and the experience of courts and social agencies, Miss Lenroot explained. Only about a fourth of the states, she said, now have adoption legislation that the Bureau holds necessary for adequate protection of the child and the rights of the natural parents and the adoptive parents.

Nutritional and Psychological Aspects of the Care of Patients with Bulbar Poliomyelitis

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The 1946 epidemic of acute anterior poliomyelitis in Minneapolis afforded an opportunity to observe aspects of the therapy of this disease which have not been sufficiently emphasized heretofore although shown previously to be of great importance in analogous clinical circumstances.[1,2,3,4,8] Additional reports on the problems met with in this epidemic will appear elsewhere.**

Nutritional Care

The observations were made during the care of 265 patients with dysphagia incident to bulbar poliomyelitis in the Minneapolis General Hospital between May and October, 1946. The criterion for the diagnosis of bulbar poliomyelitis was involvement of the bulbar cranial nerve nuclei, as evidenced chiefly by dysphagia, nasal regurgitation, and nasal voice. A majority of the cases revealed other higher cranial nerve nuclie involvement in addition to bulbar involvement. The greatest proportion of these patients were between the ages of 1 and 15 years and accordingly our attention was largely directed to problems concerning the pediatric age group. Poliomyelitic involvement of the musculature of the neck, trunk, and extremities was treated by the Kenny regimen of hot packs and early mobilization, supplemented in some patients by tracheotomy, and use of the Drinker-type of respirator. Increasing emphasis was placed upon the nutritional aspects of therapy during the epidemic. Early in the epidemic the dysphagic patients were provided with fluids and a part of their caloric and protein requirements parenterally. With increasing experience it became apparent that this method of administration was commonly inadequate. Furthermore, it limited physical therapy and induced apprehension and uncooperativeness on the part of the patients.

These objections were of particular significance in those patients who were unable to swallow for long periods of time. We early found an answer to this problem in the ease of passing a gavage tube on a bulbar patient with dysphagia and a depressed gag reflex. The combination of dysphagia with associated soft palate and pharyngeal paralysis and a depressed gag reflex allowed the easy, quick, and efficient passage of No. 12 to No. 16 French tubes. Accordingly, the procedure of gavage feeding was instituted on a total of 37 patients having either marked dysphagia or complete inability to swallow. The emergency and temporary nature of this procedure was explained to the patient and they were assured it would be discontinued as soon as they could again swallow.

It was found possible thus to administer by tube 250 to 300 cc. in each of four feedings of a special formula high in calories and adequate in protein, minerals and vitamins. (See Table 1.) The high carbohydrate and protein content of this feeding might be expected to produce an alimentary disturbance but this did not occur. Rather, it had a salutary effect on the persistent constipation which was found to accompany this disease.

As soon as was consistent with the slow, partial return of function of swallowing, oral supplements No. 1 and 2, appropriately flavored, were offered in addition to the gavage feeding (See Table 2.) Gradually pureed and soft foods were added as tolerated. The weight curve of a representative case is shown in Figure 1.

Table 1

Tube Feeding — to make 1000 cc.*

Cream (20%)	250 cc.
Milk	550 cc.
Protein Complement (Dietene)**	125 gm.
Protein Complement (Essenamine)†	35 gm.
Sugar	100 gm.
Eggs (4) (raw)	200 cc.
ViPenta ‡	1.5 cc.

C-207, P-123, F-96
Calories: 2184

Table 2

Oral Feeding No. 1 — makes 1000 cc.*

Milk	500 cc.
Cream (20%)	200 cc.
Eggs (3) (raw)	150 cc.
Protein Complement (Dietene)**	100 gm.
Protein Complement (Essenamine)†	25 gm.
Sugar	50 gm.
ViPenta ‡	1.5 cc.

C-139, P-96, F-78
Calories: 1642

Oral Feeding No. 2 — makes 1000 cc.*

Orange Juice	900 cc.
Eggs (4) (raw)	200 cc.
Lactose	100 gm.

C-190, P-33, F-24
Calories: 1108

Gavage feeding was found to be a safe and readily utilized route for the maintenance and support of a favorable nutrition. The dangers usually cited in the use of the gavage tube, such as erroneous placement in the trachea, aspiration pneumonia, and aspiration asphyxia were not encountered in this series. The great majority of the children were not refractory to the gavage feedings. With encouragement many of them passed their own gavage tubes.

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* These preparations were devised by Miss Eileen Hanson, Pediatric Dietitian, Minneapolis General Hospital, Minneapolis, Minnesota.

** Dietene Company, Minneapolis, Minnesota.

† Frederick Stearns Company, Detroit, Michigan.

‡ Hoffmann-La Roche, Inc., Nutley, New Jersey.

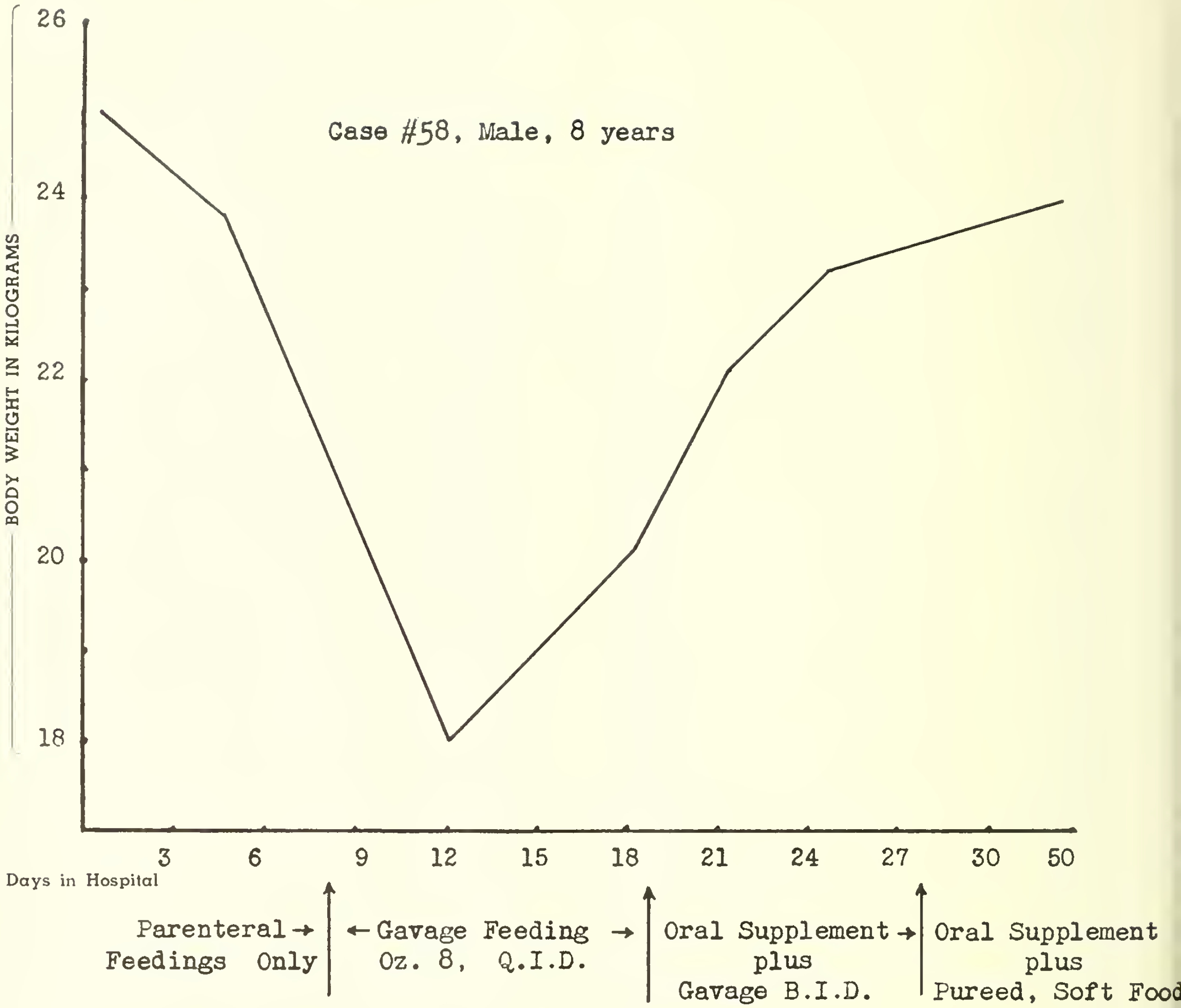

Fig. 1. This is a representative case with involvement of cranial nerve nuclei IX, X, XII(L), and marked paralysis of both upper extremities. This child was unable to swallow liquids of any kind for 19 days and had marked nasal voice, nasal regurgitation, complete paralysis of the soft palate, and marked deviation of the tongue to the right.

In the occasional child in whom difficulty was encountered in gavaging due to an easily aroused vomit or gag reflex, and in all who were deeply lethargic or comatose, preference was given in the nutritional supportive therapy to infusions of amino acid-glucose preparations.

Several specific procedures were utilized in teaching the patients to swallow. One of the most successful of these was that of having the child take a sip of fluid, purse the lips tightly, breathe in through the nose, hold the nose, then swallow. The initial swallowing of liquids was best accomplished by keeping the child in the supine position and allowing him to introduce the fluids into the mouth with a rubber-tipped dropper, thereafter following the nose-holding routine already outlined. When the patients were able to try pureed foods, this same procedure carried out in the upright position worked to best advantage. The initial experience in each of these successive achievements was closely supervisd.

The profuse sweating induced by the frequent application of hot packs increased the requirement for water and sodium chloride in these patients. Proctoclysis was found to be of assistance in providing for this exceptional requirement. By reason of the intestinal atonia accompanying this disease rectal fluids, consisting of 5 per cent glucose in normal saline, were well tolerated and amounts ranging from 400 to 800 cc. daily were well retained.

Psychological Needs of the Patient

The anxiety and occasional depression of these patients were frequently found to interrupt the therapy instituted for them. Uncertainty and apprehension were of particular significance in the smaller children who found themselves suddenly thrust into a hospital ward environment, unable to swallow or to speak clearly, and choking on their own secretions. Many children were acutely concerned about the prospect of being cripples, and this constant fear presented a problem. Such children were not allowed to dwell on their weakness, stiffness, or paralysis, but their interest was transferred to other thoughts of environment and ward activity, and adequate reassurance as to their progress and favorable outcome was given frequently.

To aid in providing a good psychological environment, patients having like involvement were grouped in wards, and a serious effort was made to become familiar with each patient and his individual traits and problems. It was acknowledged that apprehension and associated emotional problems were often not adequately solved, but even a slight effort to discuss these matters with the patients produced gratifying results.

It was found possible by explanation and demonstration to teach all but a few of the patients to use a bulb syringe to aspirate the secretions pooled in the pharynx. With more instruction, some of these patients learned to pass their own gavage tubes. These achievements and others, such as the initial accomplishment of swallowing, the maintenance of recumbent position during packing, and cooperation in exercises were generously praised by the nurses and physicians before the patient's wardmates.

This attention to the psychological needs of the patients was rewarded by the attitude of optimism and cooperation which was achieved on the wards. This attitude was maintained with some exceptions throughout the prolonged convalescence which some of these patients required.

DISCUSSION

Nutritional Factors

Malnutrition following acute bulbar poliomyelitis is such a consistent and early accompaniment of the disease that there is a tendency to consider it an inevitable part of the clinical picture. The assumption that the body stores can adequately meet the nutritional demands of short or prolonged starvation is unwarranted in view of our present knowledge of nutrition.[1,2,4,5,8]

Malnutrition usually starts shortly after an acute disease process begins, and it is at this time that measures to ensure adequate intake of dietary essentials will be most successful. The malnutrition developing in an acute disease is considered to be the result of two processes: (1) the "toxic destruction of protein" due to tissue destruction as a direct effect of the disease process,[3] and (2) decreased intake of dietary essentials. Little is known regarding the mechanism of the former but there is some evidence to indicate that a large protein intake does not prevent such loss. It is toward the second cause of malnutrition that our attention has been primarily directed.

Loss of body stores of fat occurs in disease due to the unsatisfied caloric need, and in a prolonged wasting disease such as poliomyelitis these fat stores may be rapidly exhausted. This is particularly true of the bulbar patient with dysphagia. Likewise, attention must be paid to the increased protein needs of these patients. It has been shown that daily protein losses of three or more grams per kilo of body weight frequently accompany an acute disease process.[3]

Since anoxia is seen so frequently in the severe bulbar cases of poliomyelitis, it is interesting to note the relation of the amino acids in the diet in offering some degree of protection in experimental oxygen want.[6] Hemorrhagic edema of the lungs is a very frequent finding on autopsy of bulbar poliomyelitis deaths and Leblond et al.[7] showed "increased incidence and seriousness of hemorrhagic edema of the lungs with decreased resistance to anoxia" in fasting laboratory animals. Much other investigational work has been done suggesting the deleterious results of even short periods of fasting and malnutrition.

PSYCHOLOGICAL FACTORS

Attention to the personal emotional needs of these patients has proved most profitable. Such attention is more effective if initiated during the acute period of illness, and has been more successful in the case of children. Sustained benefits of this attention have been manifested by optimistic and cooperative attitudes maintained by a majority of our patients throughout their prolonged convalescence.

CONCLUSIONS

1. It is possible to maintain nutrition during the acute stage of bulbar poliomyelitis.
2. Gavage feeding of these patients is a safe and readily utilizable method of feeding.
3. Proctoclysis is a valuable adjunct in the maintenance of adequate fluid intake in the bulbar patient.
4. The importance of maintaining a cheerful and optimistic ward psychology for patients with bulbar poliomyelitis should be emphasized.

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Observations on a Poliomyelitis Outbreak in North Dakota in 1946

(With Special Consideration of Spinal Fluid Findings)

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EIGHTY children with poliomyelitis were seen during the summer and fall of 1946. Thirty-three of them lived in Fargo or Moorhead, while the remaining 47 were from West Fargo or from more distant points in North Dakota and Northern Minnesota. The first child with the disease, a 10-year-old boy severely ill with bulbar and spinal involvement, was hospitalized on July 18th. In this series there were 8 cases during July, 29 during August, 31 during September, 8 during October, with a sharp drop to 1 in November and 3 during December. Forty-one of these children had abortive or non-paralytic cases, while 39 were paralytic in type.

TABLE 1
The Monthly Incidence of Poliomyelitis

	Abortive	Paralytic	Total
July	5	3	8
August	15	14	29
September	19	12	31
October	2	6	8
November	0	1	1
December	0	3	3
Total	41	39	80

This series represents approximately one-half of the cases cared for locally during the epidemic.

The ages of the children were: 7 under 2 years, 31 from 2 to 6 years, 28 from 6 to 13 years, and 14 from 13 to 16 years. This would tend to indicate that the period of greatest susceptibility is from 2 to 13 years of age, with perhaps the greatest emphasis on the 2 to 6 year age group.

In 30 children there was a contact (known or possible) with a case of poliomyelitis within a 2 or 3 week period before the onset of illness. In a number of the other cases the child lived in a neighborhood or vicinity where other cases of the disease had originated. Almost one-half of the children were from rural or semi-rural areas.

The most common early symptoms of poliomyelitis were fever and headache; they were presenting complaints in 58 and 48 children respectively. Neck pain and stiffness were present in 38 children; backache and stiffness of the back were presenting complaints in 23 children; nausea or vomiting occurred in 15; diarrhea occurred in only 4 patients. Unsteadiness and coarse tremors were present in 11 children; although not present in a large percentage of patients it was found that tremors on extending the arms and hands, or on other voluntary movement was one of the most diagnostic signs of the disease. Weakness or parlysis was an early complaint in 13 children. General malaise without specific localizing symptoms occurred in 9 children. Sore throat was present in 7 children. Other varied symptoms occurred in 12 children. Combinations of the afore-mentioned symptoms occurred together. The early symptomatology was identical in the abortive and in the pre-paralytic stage of the paralytic cases.

The physical findings were typical and easy to elicit except in infants and young children. A positive back sign was found to be the most valuable aid in diagnosis in almost every case. With the child lying on his back the examiner's hand is placed in back of the child's head; the child is told to raise his head and look at his feet while at the same time gentle pressure is exerted to flex the neck and back. In more than one-half of the children attempted flexion of the neck and back was painful and difficult. In the remainder the child was placed in a sitting position with the legs extended straight before him on the table; when this is done it is usually impossible to sit upright and he assumes the tripod position, with the hands and arms bracing him from behind. In a small percentage of children it was necessary to flex the neck while in the sitting position to elicit the sign; on flexion of the neck there is pain and a pulling sensation in the lower back and sometimes also in the dorsal region. A positive Kernig's sign was almost always found. Muscular hyperesthesia or weakness was not often present at this stage of the disease. The sensorium was clear in all children, although a few were drowsy and apathetic. The significance of tremors has already been mentioned. The typical symptoms and signs were not routinely present in the infant and young child; in 2 cases in children 2 years of age or less the diagnosis would not have been made had not a slight limp developed.

The body temperature was most often between 100° F. and 102° F. rectally during the first few days of illness; this was true in 43 children. In 15 children the temperature was between 102° F. and 103 ° F.; in 5 it was between 99° F. and 100° F. rectally. The body temperature was not related to the type of involvement except in 2 children with bulbar symptoms during the critical stage of their illness when the temperature was higher than at other times. The temperature ordinarily dropped to a normal value within 2 or 3 days, but in some children it tended to remain elevated for about a week.

The onset of paralysis was within the first week of illness, usually during the first 2 or 3 days. After the body temperature had been normal for 24 hours we felt reasonably certain that paralysis would not develop if it had not already done so.

The white blood count usually showed a relative leukopenia, as it was lower than 10,000 cells per cubic millimeter in 40 out of 56 counts taken during the acute stage of the disease. In no case did it ever go as high as 20,000 cells per cubic millimeter.

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Examination of the spinal fluid was carried out in 64 cases in which the child was seen during the first 2 or 3 days of illness.

Table 2
Spinal Fluid Cell Count in Relation to Type of Involvement

Cell Count	Abortive	Spinal	Bulbar or Bulbospinal	Total
0 to 10	19	4	0	23
11 to 20	0	1	0	1
21 to 100	10	6	4	20
101 to 900	9	9	2	20
Total	38	20	6	64

It may be seen that the spinal fluid cell count was 10 per cubic millimeter or less in 23 children and higher than that number in 41 children. The spinal fluid total protein was 30 milligrams per cent or less in 46 children, between 30 and 40 milligrams in 2 children, and over 40 milligrams in 7 children. Spinal puncture was repeated in only 1 case, that of a particularly toxic child; spinal fluid cell count and protein remained within normal limits when the tap was repeated two days after the original one. The significance of these spinal fluid findings will comprise the major part of the discussion.

The relationship of tonsillectomy, especially recent tonsillectomy, to the development of bulbar poliomyelitis has been recognized for several years.[1,2,3,4] In none of the children in our series had tonsillectomy been performed within 30 days; there was one child who had had his tonsils and adenoids removed 2 months before onset, but his disease was abortive. Another had had bronchoscopy for removal of a peanut from a lung 5 days before onset of paralytic poliomyelitis. His case was not bulbar; it is conceivable that trauma to his respiratory passages favored invasion of the virus. Fifty-one children still had their tonsils, whereas 29 had had them removed. It has been our custom for the past 5 years to prohibit tonsillectomies in children after the middle of the summer until the advent of freezing weather. During 1946 tonsillectomies were stopped after the end of June, as it was felt that the virus might make an early appearance in the community.

Treatment consisted of medical and nursing care of the patient during the acute stage of the disease with particular emphasis on the hydration and general well being of the child. Hot packing according to the Kenny technique was used routinely; an orthopedist and physiotherapist supervised that portion of the treatment, and started passive and active motion and muscle re-education of affected extremities as soon as the acute stage began to subside. There were 7 children with high cervical and possible bulbar involvement; 5 of these required a respirator for a period varying from days to weeks. Special nurses were with these children at all times. A suction apparatus was kept beside them and was used to aspirate secretions from the pharynx. Nourishment was given by mouth to these children when possible; when necessary, tube feedings were used, or intravenous fluids given. Tracheotomy was not necessary in any of these children. All of them have been able to resume their own respiratory and swallowing functions, although all but one child of this group still has considerable paralysis of the extremities.

There have been no fatalities among the 80 children in this series. There were 10 children with slight residual paralysis, in which normal activity is possible and in which complete recovery is likely. In 17 children there is moderate to severe paralysis of one or more extremities, but contractures have been almost completely prevented, and improvement of function has occurred in all. In children with complete paralysis of an extremity, return of function has been slow. Treatment over a period of months or even years will be necessary in those children. It should be mentioned that in many of the so-called abortive cases there was a persistent stiffness of the spinal muscles, which in some instances required an extra week or two of hospitalization. These children require periodic examinations in order to prevent scoliosis, or to institute early treatment if it should occur.

In this epidemic we were fortunate to have adequate facilities for the care of patients with poliomyelitis. A year before this outbreak occurred plans were made to handle such an emergency by interested physicians, hospital authorities, representatives of the National Foundation for Infantile Paralysis, the Division of Child Welfare of the State Health Department, the City Health Department of Fargo, and laymen's groups. Equipment was purchased by the National Foundation to equip a poliomyelitis unit at the Fargo Isolation Hospital. When the emergency came the general hospitals took what patients they could, and then supplied nurses to staff the "polio unit," which was in operation from August until October. The hospital care given patients was excellent, whereas without such cooperation and advance preparation that might not have been possible.

Preventive measures were instituted after the epidemic gained headway. These consisted of closing the public swimming pool, prohibiting attendance at moving picture shows to all children under 15 years old, newspaper publicity warning the public against gathering in crowds, and advice concerning measures to promote general health and resistance against infection. The opening of schools was delayed for several weeks.

Discussion

The diagnosis of poliomyelitis in its abortive form is one of the most difficult problems confronting the physician. It has been customary to rely on positive spinal fluid findings to establish the diagnosis in doubtful cases. Paul[5] has shown the fallacy of this policy in a study of two epidemics in which careful epidemiological and virus studies were made. Spinal fluid findings were usually within normal limits, yet in those cases the virus of poliomyelitis was repeatedly recovered from the nasopharynx, and from the stools and intestinal washings. Abortive cases in those epidemics outnumbered paralytic cases by 8 to 1, indicating that poliomyelitis during an epidemic may be as common as measles or any other contagious disease. Illingworth[6] reported 100 cases of poliomyelitis in a military hospital in the middle east, in which 54 patients had normal spinal fluid cell counts, and 46 showed an increase in cells. There was no difference clinically in the two groups; 30 per cent of each group was paralytic in type and 70 per cent abortive. At the Minneapolis General Hospital 8 per cent of 164 paralyzed patients during an epidemic had normal spinal fluid cell counts during the acute stage of the disease.[7] Similar findings have been reported by others.[8,9,10]

We were hesitant to diagnose poliomyelitis in the presence of normal spinal fluid findings. However, if the physical findings and history were typical, and a 24 to 48 hour period of observation showed no other cause for complaints, we felt that such a diagnosis was justified and necessary. We took particular pains to rule out pneumonia, often by X-ray examination, as it is a fairly common cause of meningismus. There were 38 abortive cases in children on whom we did a spinal puncture; one half of these had a normal cell count. There is a question as to whether the majority of these should actually be called abortive cases, as spinal stiffness often persisted for 3 to 4 weeks, and in several children for over 3 months. There was also a striking tendency in many of them to be listless and have poor appetite for a month or more. In addition to the aforementioned cases there were 12 other children who were isolated at home because of lack of sufficient evidence to classify them as having poliomyelitis in the absence of spinal fluid changes. There were 26 paralytic cases in which puncture was made; 4 of the 26 children had normal cell counts.

In spite of the frequent negative evidence supplied, it is felt that spinal puncture should be done whenever possible in the early stage of poliomyelitis. It is a harmless procedure when done with proper precautions.[11] It is valuable as a diagnostic procedure when positive, and also may help to relieve increased fluid pressure and headache to some extent. As an example of its value, a 2 year old child who was sent in as a possible case of poliomyelitis proved to have fluid changes characteristic of meningococcus meningitis, and responded promptly to specific treatment.

It has been found that spinal fluid protein values are helpful in the diagnosis of questionable cases of poliomyelitis;[13,14] they tend to be moderately elevated during the first week, going higher during the following 2 or 3 weeks. In the majority of our cases, protein levels were within normal limits and we did not repeat them later.

Treatment of our patients was carried out along generally accepted lines. Prostigmine has been recommended for the relief of muscle spasm,[15] but was disappointing in our hands. We did not use curare, and there is evidence that its dangers outweigh its value.[16] The use of the respirator was a life-saving measure in children with high cervical involvement and there were no fatalities. In true bulbar cases (irregular pulse, respiratory pharyngo paralysis, and the like) the respirator generally seems contra-indicated. Tracheotomy has been reported as lifesaving in many of the latter when secretions accumulate in the pharynx too rapidly for adequate removal.[17] We were prepared to carry out tracheotomy but it proved to be unnecessary in this series. In those with apparent combinations of involvement, the respirator was sometimes of temporary value. Constant nursing care, frequent suctioning of the pharynx, the use of oxygen and stimulants when needed were important factors in riding these children through the critical phase of their illness.

In attempting to prevent spread of the disease there was some question as to the advisability of closing swimming pools, schools, and warning against public gatherings. If it is true, as Paul [5] and Casey [18] have found, that poliomyelitis is a common disease during epidemics, in which abortive cases greatly outnumber paralytic cases, there can be little question concerning the advisability of these precautions. Multiple cases in families and neighborhoods are the rule, and indicate spread by way of the respiratory tract. The virus can be found in the nasopharynx during the first week of illness.[5,19], and many people have such slight symptoms that they continue their regular routine. The virus can also be isolated from sewage [20] and often from the stools of patients several months after recovery. This may help to explain the rural incidence of the disease as it might possibly be spread in the same way as typhoid fever. Trask found the virus in flies trapped near a contaminated privy. Chlorination of water in the usual amount does not kill the poliomyelitis virus [19] which indicates that the closing of swimming pools is a wise measure from that standpoint, as well as being an aid in preventing the gathering of crowds.

SUMMARY AND CONCLUSIONS

The cases of 80 children with poliomyelitis have been analyzed. Our results and reports in the literature indicate that alterations in spinal fluid findings are not essential to the diagnosis of poliomyelitis; of primary importance are the history and physical examination of the patient. In one half of abortive cases and in 15 per cent of paralytic cases, the spinal fluid cell counts were normal during the early stage of the disease. No fatalities occurred in these 80 children. Epidemiological and virus studies reported in the literature show that the virus of poliomyelitis is harbored in the throat as well as the intestinal tract; spread of the disease is characteristic of air-borne infections, with the likelihood that sewage and insect vectors may also play a part. It appears wise to keep children away from crowds during epidemics, as susceptibility is greatest during childhood;[5,13,18] although present to a lesser extent in adults as well. Advance preparations by interested groups made adequate care of patients possible during this epidemic.

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Apparatus for the Relief of Acute Obstructive Laryngitis

Treatment of a Fulminating Case Due to H. Influenza

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CLASSICAL methods of treatment for obstructive laryngitis have included steam, intubation and occasionally tracheotomy. Etiologically the Streptococcus, Pneumococcus, and Staphylococcus were considered of primary importance.

Emphasis has more recently been focused upon low temperature humidity [1] oxygen-helium mixture, early tracheotomy, sulfonamides, antibiotics and antibody preparations. Great benefit has resulted from the use of the newer specific agents but adjuvants such as low temperature humid oxygen have not only been insufficiently stressed but practical methods of applying and controlling these have not been available. Their early use in conjunction with specific agents can prevent the need of tracheotomy as well as alleviate the post-tracheotomic care.

The purpose of this presentation is to describe an apparatus for controlling humidity, temperature, and oxygen, and to report a case of fulminating *H. Influenza* type B laryngotracheobronchitis with pneumonia in which it was successfully employed. It is hoped that the protocol will serve to emphasize the importance of prompt recognition of *H. Influenza* as a possible cause of obstructive laryngitis, the value of streptomycin, sulfadiazine and influenzal rabbit serum (antibody) as specific agents in treatment, and the need for "shotgun" empiricy while awaiting bacteriologic diagnosis.

CASE HISTORY

J. A., 11-year-old white female, was apparently well on April 15, 1947, until about 5:00 P.M., when she complained of a sore throat. Examination revealed pharyngitis, cervical adenitis, and a temperature of 102 degrees. About 10:30 P.M. she developed respiratory distress which progressed rapidly and her temperature rose to 104 degrees. By midnight her respiratory distress became marked; mild cyanosis, increasing pulse rate, marked retraction and extreme restlessness were noted. Her respiratory rate was 60 to 70 per minute; pulse 130 per minute. She had an expression of anxiety and fear with an ashen color to the face. There was a moderate cervical adenitis. A slightly reddened pharynx was present. Examination of the chest revealed marked retraction of the suprasternal notch, intercostal spaces and substernal area with a great heaving of the chest. The heart rate increased from 130 to 160 per minute during the examination. The rhythm was regular and no cardiac enlargement or murmur was detected. The abdomen was distended moderately. The skin was hot, moist and ashen in color and the nail beds showed some cyanosis.

She was given aminophyllin gr. 3¾ intravenously upon admission as well as continuous oxygen, penicillin 62,500 units intramuscularly and streptomycin 200,000 units intramuscularly. She showed no response and the pulse kept increasing until it reached 180 per minute. Respiratory distress increased and laryngoscopic examination showed severe epiglottic edema and redness. A tracheotomy was done at 3:00 A.M. which gave some respiratory relief. A culture was taken from the mucus. She was given sulfadiazine Gms. IV intravenously. Respirations became more labored at 7:00 A.M. although the tracheotomy tube did not appear to be obstructed. The cyanosis increased and restlessness became greater. The tracheotomy tube was replaced with little or no relief of respiratory distress. A chest film revealed a massive pneumonitis, more marked on the right. The white blood count was 2500 with 80 per cent polymorphonuclears. Many cells were toxic and a shift to the left was seen. 100 mgm. of *H. Influenza* antibody diluted in 500 cc. normal saline was given intravenously, followed by 250 cc. whole blood from a student nurse who had recently recovered from a severe laryngitis. This was followed by another 50 mgm. *H. Influenza* antibody in 250 cc. normal saline. She was kept in an oxygen tent with the atomizer maintaining the humidity of 90 per cent with a temperature of 72 to 75 degrees F. Respirations continued at about 60 per minute and the pulse at 140 to 160 per minute. She required sedation to allay her marked apprehension. Sodium phenobarbital gr. 1 did not affect her, therefore sodium amytal intravenously was given, gr. 1 at a time until she had a total of approxigately gr. 6½ during the first twenty-four hour period. Streptomycin, 200,000 units every three hours, was given intramuscularly and sulfadiazine Gms. 1 every four hours intravenously.

A capsular swelling test on the patient's serum performed the next day was strongly positive in dilution 1:4, and suggestive in dilution 1:8. Leucocyte counts were 12,000 and 18,000. 100 mgm. of *H. Influenza* antibody was again given intravenously in 500 cc. normal saline. Fluids were maintained at 2800 cc.; 1000 cc. subcutaneously, 1000 cc. intravenously, and 800 cc. orally. There was a gradual clinical improvement, and a chest film the second day showed beginning resolution of the pneumonitis. She required sodium amytal sedation periodically to suppress her threshing movements. A capsular swelling test on the patient's serum the third day was positive in dilution of 1:4. The patient's condition was again improved. A chest X-ray taken in prone and sitting positions showed more resolution of the pneumonitis. She was given 100 mgm. *H. Influenza* antibody intravenously. Streptomycin 200,000 units, intramuscularly

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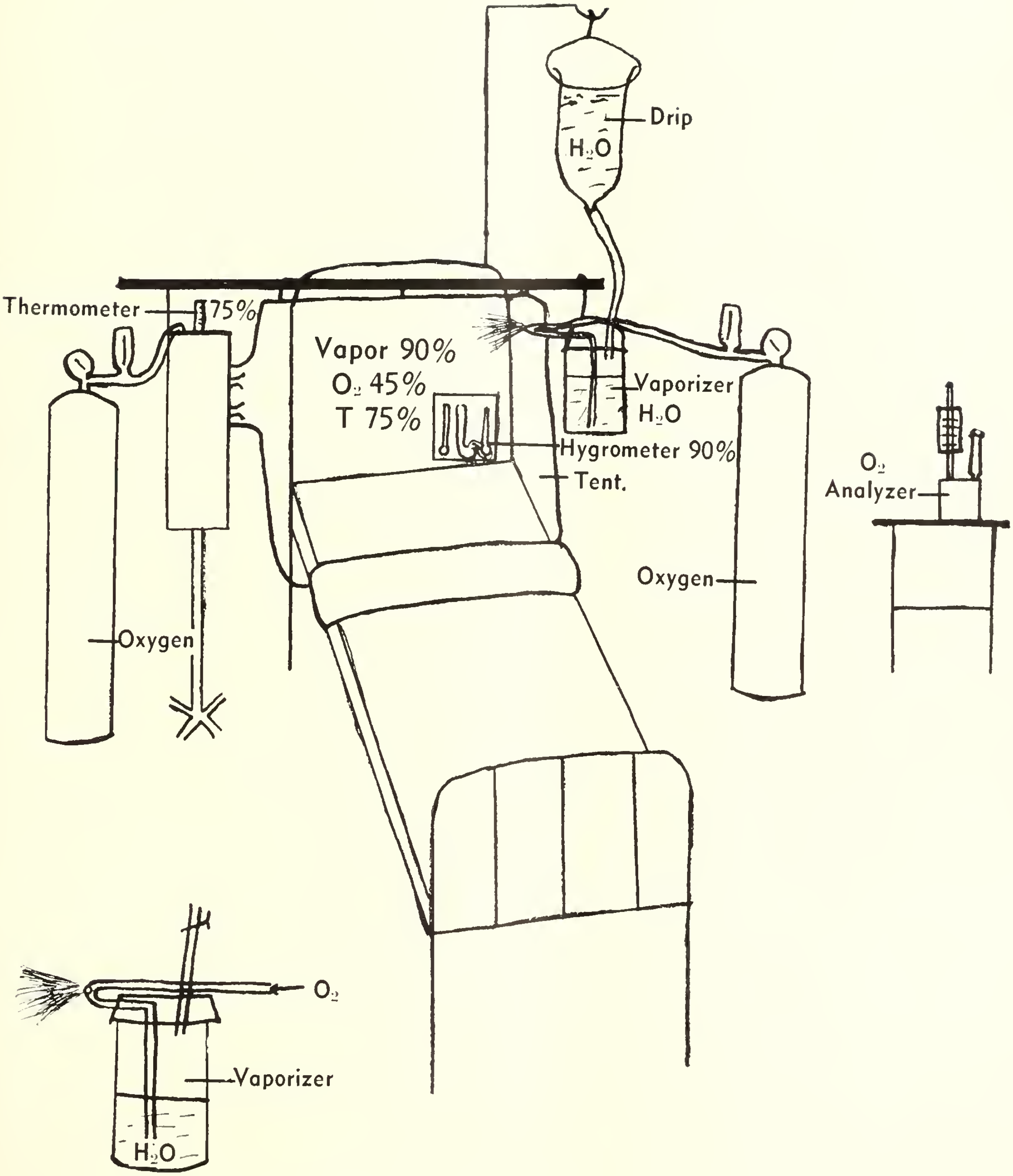
Technical assistance was given by Mr. Edward Fish of the ABC Oxygen Company, Minneapolis, Minnesota.



Apparatus for controlled oxygen, temperature and humidity.

every three hours, penicillin 25,000 units intramuscularly every three hours, and sulfadiazine Gms. 1 every four hours were continued. The patient was also maintained in the oxygen tent with humidity constantly at 90 per cent. The clinical course was favorable. Respirations decreased in labor and rapidity; her pulse rate decreased and the secretion aspirated from the tracheotomy tube became thinner and easier to remove. These secretions were very viscid when the tracheotomy was performed and required frequent suctioning.

DISCUSSION

This case conforms to the description of Influenzal tracheobronchitis by Alexander[2] with its sudden onset and fulminating course. The usual beginning is with mild fever, difficulty in swallowing, and complaint of sore throat. The dyspnea starts abruptly and increases to a marked degree in a few hours. Examination of the larynx shows diffuse erythema, often with evident edema. Direct laryngoscopic examination shows almost complete approximation of the posterior wall of the epiglottis to the swollen arytenoid-epiglottic folds. Alexander[2] states that the cervical lymph nodes are at times enlarged and usually the obstruction in breathing is due almost exclusively to edema of the epiglottis and other supraglottic structures. This was true in our case except that the respiratory difficulty was not completely relieved by tracheotomy and the cause was found by examination of the chest, revealing the massive pneumonitis.

It was felt that tracheotomy was the treatment of choice. This is in agreement with Orton et al.,[3] who found that of eight patients with laryngotracheobronchitis intubated, one survived. There was a lesser mortality in their patients who were tracheotomized. Our patient probably would not have survived had intubation been done because of the extensive involvement of the pulmonary system.

All of the chemotherapeutic agents, namely sulfadiazine, streptomycin, and penicillin were started immediately until a bacteriological diagnosis could be made and a culture from the mucus revealed *H. Influenza*. The sulfadiazine and streptomycin were continued because of their effectiveness against this organism. Alexander et al.[2] have shown the effectiveness of sulfadiazine and H. Influenza antibody against this organism. The antibody was used in this case even before the bacteriological diagnosis returned because the laryngoscopic examination was characteristic of *H. Influenza* infection. The penicillin was maintained to prevent secondary invaders. Alexander[4] has demonstrated the effectiveness of streptomycin against *Hemophilus Influenza* both in vivo and in vitro and states that in meningitis of average severity due to this organism, streptomycin alone brings about complete recovery but if the infection is severe, streptomycin is limited in its ability to cure. Our patient was critically ill and it was felt that strepomycin, sulfadiazine, and antibody were all necessary.

The humidifier used in this case is one that has been used at Northwestern Hospital for the past few months in conjunction with an oxygen tent (see diagram). It is composed of a quart size Mason jar with cap. The cap is perforated in two places, one for the atomizer tube to be immersed in the water and the other for the drip tube, to allow a constant level of fluid to be maintained in the jar. Oxygen pressure is used to create the suction at the distal opening in the atomizer tube. A voluminous fine mist is thereby delivered into the tent. We are able to maintain humidity at 90 per cent and a tent temperature of 72 to 75 degrees while keeping the oxygen concentration at 50 per cent. Readings from the indicators can be recorded every hour by the nurse in attendance using the thermometer, dry bulb hygrometer and oxygen analyzer. Nebulized streptomycin or penicillin can be intermittently administered either into a small hood or B.L.B. mask over the patient's nose and mouth. In tracheotomized patients it is important to maintain a high humidity in order to prevent drying of the secretions which results in their becoming very tenacious. Our patient was comfortable at all times in the tent even with this high degree of humidity and low temperature.

SUMMARY

1. A method of controlling temperature at 68 to 75 degrees; humidity at 90 per cent, and oxygen concentration at 50 per cent in the treatment of acute laryngitis is described.

2. Nebulized antibiotics can be administered intermittently while the patient is in this optimum environment.

3. A critically ill patient with laryngotracheobronchitis and pneumonia caused by *H. Influenza* was treated successfully with this apparatus. Specific agents, namely streptomycin, sulfadiazine, and influenzal antibody brought about a gradual resolution of the infectious process.

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Unusual Causes of Hematuria in Infants and Children

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Practically every disease of the urinary tract at some time or other may be accompanied by hematuria.[1,2,3,6] The following classification taken from Higgins[1,6] serves to illustrate the more common causes:

- I. Hematuria in general disease:
  - A. Acute fevers; tonsillitis, scarlet fever, rheumatic fever and the like.
  - B. Chronic infection; endocarditis (renal infarction), malaria.
  - C. Blood dyscrasias; purpura, leukemia, hemophilia, polycythemia vera.
  - D. Deficiency and dietary disease; scurvy and liver deficiency.
  - E. Disease of unknown etiology; Hodgkin's disease; hypertension or arteriosclerosis with renal involvement, periarteritis nodosa.
  - F. Following medication; sulfonamides, methanamine, salicylates, barbiturates, mandelic acid, and the like.
  - G. Urethral:
    - 1. Infection.
    - 2. Stricture.
    - 3. Tumor.
    - 4. Following instrumentation.
- II. Hematuria due to intrinsic disease of the urinary tract:
  - A. Renal:
    - 1. Calculi or crystals.
    - 2. Nephritis.
    - 3. Tumor—capsular, parenchymal, pelvic.
    - 4. Infection—acute or chronic including tuberculosis.
    - 5. Anomalies—polycystic disease, horseshoe kidney, nephroptosis, and the like.
    - 6. Trauma.
  - B. Ureteral:
    - 1. Calculi.
    - 2. Infection.
    - 3. Stricture.
    - 4. Tumor.
  - C. Vesical:
    - 1. Tumor.
    - 2. Infection.
    - 3. Calculi or foreign bodies.
    - 4. Ulcer.
    - 5. Trauma
  - D. Bladder Neck:
    - 1. Prostate, including seminal vesicles.
- III. Hematuria associated with extraurinary pathology:
  - A. Acute appendicitis.
  - B. Diverticulitis of the colon.
  - C. Neoplasm of the colon, rectum, or pelvic structures.
  - D. Acute or chronic salpingitis.

The commonest causes in adults are nephritis, stone, infection, tuberculosis and tumor.[2] In our experience, nephritis, both acute and chronic, is all too common in children. Cahill,[3] in 1942, said that "calculus of the urinary tract is the most frequent single pathological condition in urology in New York." Kidney, ureteral, or vesical stones, however, are extremely rare in children, at least in this part of the country.[9] Tuberculosis of the kidney is also quite rare in children. Tumor of the kidney, the most common tumor affecting the urinary system in children, is usually diagnosed by the feeling of a hard mass in the abdomen. It does not usually cause hematuria.

The commonest cause of a microscopic hematuria in infants and children is some manipulative procedure such as dilating the foreskin or breaking labial adhesions.

The next commonest cause is pyelonephritis, pyuria, or pyelitis. Pyelonephritis is the most accurate term as in almost every case there is some extension from the renal pelvis into the parenchyma of the kidney. We see this condition almost invariably in girls under the age of three years. Some have bacilluria and no pyuria, some have mostly pyuria and only a small amount of hematuria while a few have equal amounts of pus and blood in the urine.

Most children with pyelonephritis can be cured simply, if the organism can be found, by culturing a catheterized specimen of the urine. The most efficacious chemotherapeutic agent may then be used. Chronic pyelonephritis is a more difficult problem.

Our present method of treatment of a first attack of pyelonephritis consists in three weeks of sulfathiazole, about 1 gram a day, followed by three weeks of ammonium mandelate, 4 teaspoonfuls a day, plus a restricted fluid intake.

Lately, we have seen three children with hematuria (of obscure origin) as their main complaint. They have all had catheterized urines for culture for both the ordinary and acid fast organisms, intravenous urograms, cystoscopy, kidney function tests, (PSP, concentration and dilution, non-protein nitrogen), blood pressure determinations, and complete blood studies, including prothrombin, platelet counts, bleeding and clotting times. All of the above should be included in a complete urologic survey when looking for the cause of hematuria; all can be done with a minimum of expense in the office, except the intravenous urogram and the cystoscopy.

CASE HISTORIES

Case 1. J. L., a 5-year-old white male, was admited to the hospital on May 17, 1946, with the complaint that he had been very irritable for two days and then had been passing grossly bloody urine for one day. Physical examination revealed a small child, not acutely ill, with an oral temperature of 100.3, a mild pharyngitis and a one-plus right cervical adenitis. His blood pressure was 108/60. Laboratory examinations revealed: hemoglobin of 13.5 gms., white blood count of 10,800 with 63 per cent polymorphonuclear cells, 26 lymphocytes and 9 per cent eosinophiles. The urine was loaded with red blood cells, albumin was negative and the specific gravity was 1.004. Sedimentation rate on the first hospital day was 26 mm. in one hour. A phenolsulfonphthalein test on the fourth hospital day showed 60 per cent excretion of the dye in two hours. A tuberculin test 1:1000 was positive on the third hospital day. Course in the hospital was uneventful. His urine was clear on the second hospital day. Temperature also fell to normal immediately, and he had no further complaints. Although a positive urine culture of Aerobacter aerogenes was reported, the organisms were thought to be a contaminant so that he received no treatment. Several urine specimens were obtained directly from each ureter and sent to the laboratory for guinea pig inoculation; however no acid fast organisms were found. Intravenous urogram was normal except for a mild dilation of the right ureter. The patient was discharged on the sixth hospital day with a tentative diagnosis of nephritis or tuberculosis of the kidney. He remained at slightly restricted activity for six weeks and then was seen in the office where physical examination, blood, including sedimentation rate, and urine studies were normal. He was discharged as being in perfect health; however, two days later he became very irritable, developed a severe pain in the left lower abdomen which lasted a few minutes, and then passed bloody urine. While in the hospital three days, all laboratory findings were essentially negative as again the urine became clear immediately. He had no complaints for two months and then contracted a mild sore throat, became very irritable and passed smoky urine which was loaded with red blood cells. He was immediately taken to the hospital and prepared for cystoscopy in order to determine from which ureter the blood was coming, but as he began to pass normal urine shortly before the cystoscopy, he was not cystoscoped. About four months later he was again seen in the office because of complaint of listlessness and fleeting joint pains. Findings were negative. He was, however, started on a regimen of lessened activity and one nap a day and responded very well. About six weeks after this visit, he became irritable one night and the next morning was again passing smoky urine which was loaded with red blood cells. Unfortunately, he had eaten a rather hearty breakfast so that the urologist did not feel cystoscopy under general anesthesia indicated. Four hours later when we checked him again, his urine was normal. My presumptive diagnosis of this child is that he has a hemangioma of one kidney which is bleeding intermittently.

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Case 2. M. O. is a 4-year-old white girl who was seen for the first time on January 9, 1945, with complaint of bloody urine and pain on urination of one day's duration. She had had a mild cold two weeks before the onset of the chief complaint. Physical examination revealed a small child, not acutely ill, with a rectal temperature of 102, three-plus inflamed tonsils, a two-plus cervical adenitis, a moderate sized telangectasia on the right cheek and a blood pressure of 86/?. Her urine was loaded with red cells, hemoglobin was 10.8 gms. and the white blood count was 16,900. Tuberculin 1:1000 was negative. She was treated with intramuscular penicillin for one week in the hospital and at the time of discharge her urine was normal. She was not back for five months and then came to the office because of frequency. Her urine at this time contained 35-40 white cells per high-powered field, many red cells, one-plus albumin and a pH of 5.5. Although the urine culture was negative, she was given a course of three weeks of sulfathiazole and three weeks of ammonium mandelate. At the end of this time the frequency stopped and the urine cleared up. Two weeks after the ammonium mandelate was stopped she began to complain of frequency, urgency, and polyuria. Urine examination, including specific gravities, was normal at this time. The urinary symptoms cleared up with the use of a bladder sedative and she had no complaints for three months. At this time she began to complain of aches and pains in the arms, and legs, but no urinary symptoms. Urine examination was negative at this time; however, the sedimentation rate was 30 mm. in one hour. Under restricted activity she gradually came back to normal and she had no further complaints for six months. At this time, because of frequency, urine was examined and it was found to be packed with white cells and an occasional red cell. After treatment with sulfathiazole an intravenous urogram was done. This revealed a moderate filling defect in the infundibulum of the superior calyx of the left kidney. Cystoscopy was negative. She had no further complaints until seven months later at which time she complained of frequency again. The urine was loaded with red and white cells. Catheterized urine culture revealed a pure culture of Aerobacter aerogenes. At the present time she is being treated with ammonium mandelate. After the urine has cleared somewhat we wish to do complete kidney function tests on her. Presumptive diagnoses in her case are: chronic pyelonephritis or chronic nephritis with a defect in the left kidney which has all the characteristics of a hemangioma.

Case 3. T. K. is a 17-month-old white boy. He was seen first on May 15, 1946, with the history that he had been restless at night all his life, usually having to urinate several times nightly. Urine examination revealed 1 to 2 red cells per high-powered field. It was found at this time that his father has had a persistent microscopic hematuria, cause unknown, most of his life. From this time on, every urine examined has had from 1 to 10 red cells per high-powered field. Tuberculin 1:1000, and intravenous urogram are negative. Kidney function tests were not done. Diagnosis at the present time is hematuria of undetermined origin, possibly a hemangioma of the kidney.

Hemangioma of the kidney is a rare disease. In 1903 Feniwck [11] first described its clinical manifestations and demonstrated that the basis of one type of obscure hematuria was the presence of "dilated veins in the submucosa of the renal pelvis." He called the lesion "capillary hemangioma." This lesion has been described occurring in all portions of the parenchyma or in the pelvis of the kidney, and usually ranges in size from pinpoint to 6-8 cm. in diameter.[4,5,7]

Clinically, the onset of the hematuria has occurred before the age of 40 in 80 per cent of the cases reported.[7] The tumor may occur as early in life as in the newborn and as late as in the seventies.[4] One symptom is intermittent or constant bleeding, ranging from transient hematuria over many years to a large hemorrhage necessitating emergency operation. Pain of varying severity may also be a frequent symptom. It is usually felt in one flank and may radiate down into the groin.[4] X-ray dye studies of the kidney may reveal pathologic changes. These are characterized as "filling defects of the pelvis or calyces," "distortion of contour," or "blunting of the calyces" and are usually interpreted as denoting the presence of tumor or tuberculosis.[4,7,11]

Some relationship between renal hemangioma and multiple skin hemangiomas has been suggested.[10] One of our children has several skin hemangiomas.

Removal of the kidney which shows changes in either the intravenous or retrograde pyelogram has, in all cases reported, resulted in complete cure.

SUMMARY

1. Hematuria is a sign only, of underlying renal disease and should be investigated completely.

2. The commonest causes of hematuria in children are pyelonephritis, glomerulonephritis and manipulative procedures in the genitalia.

3. Three children with hematuria of obscure origin are described in detail.

4. One obscure cause of intermittent hematuria is hemangioma of the renal pelvis and parenchyma.

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Paroxysmal Tachycardia in Infancy*

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Tachycardia in infancy has recently been found to occur more frequently than was formerly thought. In 1941 Hubbard [1] reported that there had been only 19 authentic cases in infants under one year of age. He added 9 additional cases in which the diagnosis was well established by electrocardiograms and clinical findings. In 7 of Hubbard's cases the age of onset was less than one month. In 1943, R. Platou [2] reviewed 3 additional cases in which the diagnosis was well established. Scott and Limper,[3] in 1946, reported 2 cases in infants and concurred with previous investigators on the diagnosis and treatment. Bloom and Kendig,[4] in 1946, reported a case in a 7½-month-old infant.

Infrequent determinations of the heart rate in the newborn and the variability of the presenting symptoms may account for the apparent rarity of paroxysmal tachycardia. It is our purpose to present a case in a 3-week-old infant in which the history was suggestive of pyloric stenosis. It was referred with that diagnosis.

Case Report

T. M., a 3-week-old white male infant, was admitted to the hospital on March 21, 1946. The infant was born at term at another hospital following a normal labor and delivery. Prenatal history was negative. At delivery the baby was noted to remain somewhat cyanotic and difficulty was encountered in getting the child to breathe. Artificial respiration, stimulants, and oxygen were repeatedly given. The infant responded somewhat but maintained rather rigid extremities and an opisthotonic position almost constantly. Considerable mucus in the throat required frequent suctioning. Cyanotic spells which were frequent at first, later became only occasional. Several days before admission to Northwestern Hospital the baby showed projectile emesis associated with cyanotic spells and various therapeutic measures were carried out. As formula changes and oxygen were ineffective, the child was referred as a suspected pyloric stenosis.

On admission the infant weighed 8 pounds 5 ounces and did not appear acutely ill. The turgor of the skin was poor and a dry scaling generalized rash was present. Edema of the eyelids was noted. The nose and throat were negative. The lungs were perfectly clear and there were no murmurs audible, but the heart rate was noted to be 240 beats per minute on several occasions. At other times the rate was 130. The left border of the heart was thought to be enlarged to the left to percussion. The abdomen was enlarged and firm and the liver was palpable three finger-breadths below the right costal margin. The kidneys and spleen were not palpable. The extremities were normal except for slight resistance to passive motion.

An electrocardiogram was obtained immediately (see Table 1), and the rate was 280 beats per minute in the first and second leads, but 140 per minute in the third lead. The fourth lead was not obtained at that time. The P-R interval was .07 seconds and the QRS .04 seconds. The cardiologist's impression was tachycardia of supraventricular origin.

The hemoglobin was 14 grams, leukocytes 18,000 with 35 per cent neutrophiles, 63 per cent lymphocytes, and 2 per cent eosinophiles. The urinalysis was negative except for a trace of albumen and an occasional leukocyte. An X-ray of the chest revealed no signs of cardiac enlargement or pulmonary edema.

Cedilanid, the white glucoside of digitalis, was given intramuscularly *stat.* One-half milligram, or 2 cat units, which is 2½ cc., was used, as infants tolerate this drug very well. This was repeated once a day for the next two days. The baby was offered a thick mix formula for the first few days and then shifted to a regular evaporated milk-water mixture.

The eyelid edema and the liver enlargement decreased soon after admission. By March 25, five days after admission, the baby had lost 14 ounces.

The electrocardiogram on the second hospital day showed a rate of 110 beats per minute, sinus rhythm, and a P-R interval of 0.12 seconds with a QRS of .04 seconds in all four leads. On March 23, the third hospital day, the cardiogram showed auricular fibrillation as well as a marked digitalis effect, so the cedilanid was discontinued. A total of 1.5 mgms. had been given.

In order to return the heart to a normal rhythm, it was decided to start quinidine, which was given in a dosage of 10 mgms. three times a day for five days followed by a maintenance dose of 10 mgms. four times daily. The infant was discharged on April 8, 1946, eighteen days after admission, weighing 8 pounds 1 ounce. An electrocardiogram taken on the day of discharge is shown on Table 2. According to the local physician who has followed the child, the course since that time has been uneventful.

In the above case the arrhythmia was recognized because of episodes of tachycardia in an infant previously suspected of having another condition. Our patient also had signs of right heart failure with an enlarged liver and cyanosis. Our diagnosis was substantiated with several electrocardiograms. Table 3 is a resume of the serial electrocardiogram tracings. The cardiologist was of the opinion that a shifting pacemaker was responsible for the origin of the aberrant stimuli. Justifiably, the diagnosis of tachycardia of the supraventricular type was most feasible. Under prompt treatment with digitalis a marked response was noted in the character of the tracing. In one instance auricular fibrillation was noted. Because of this and the strong digitalis effect seen in the electrocardiogram, the cedilanid was stopped and quini-

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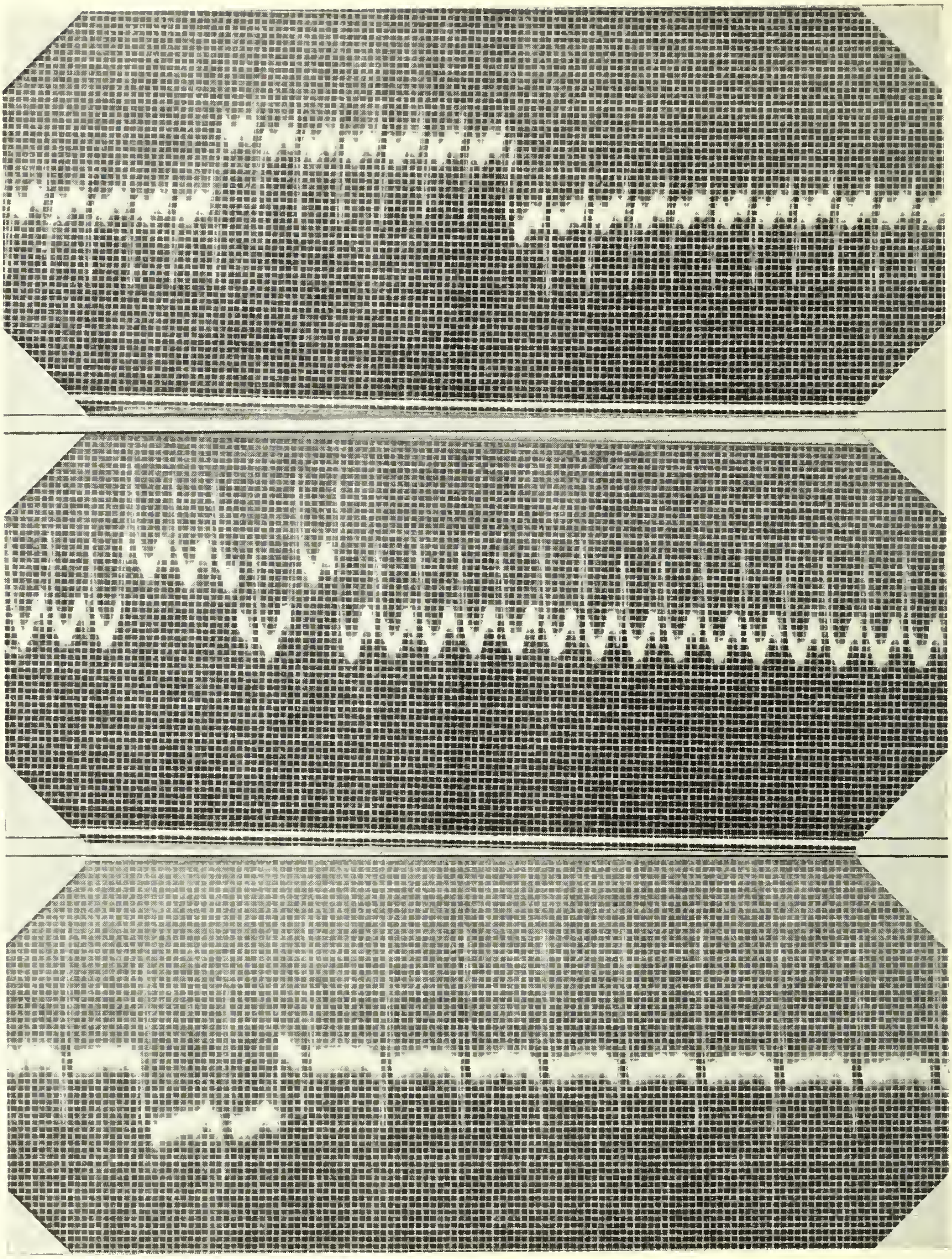
Figure 1



dine was administered. As might be expected, the emesis ceased almost coincidentally with the decrease in the size of the liver. It is assumed that this feature of the syndrome is produced in part by stretching of the liver capsule caused by chronic passive congestion following right heart failure.

SYNDROME

The syndrome is somewhat characteristic but unfortunately too easily confused with other more common pathologic conditions in infancy. The infant is usually limp during the attack, may become cyanotic, has an imperceptible radial pulse, and if the condition persists over a relatively short period of time, the baby may have emesis suggestive of pyloric stenosis. The liver may become enlarged and likewise the heart may be enlarged and at times undergo dilatation. Rales may be heard in the lungs as symptoms of left heart failure become more progressive. The spleen may become palpable, the ab-

Figure 2

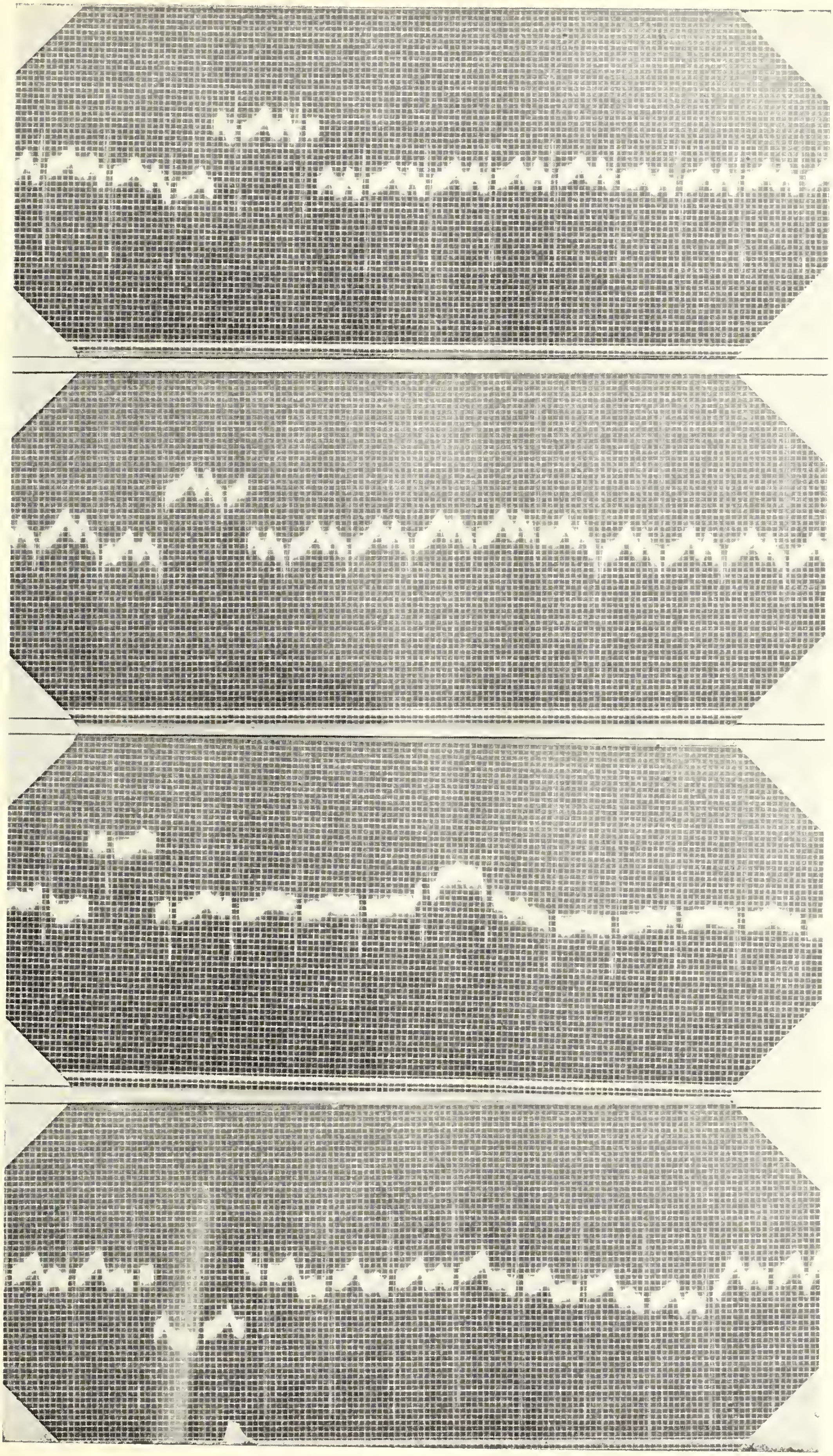


Table 3

Date	P-R	QRS	Rate	Conclusions
3/21	0.07	.02–.04	280, 140	Supraventricular tachycardia
3/22	0.12	.04	110	Tachycardia, sliding pacemaker
3/23		.06	90–110	Depressed S-T, digitalis effect, auricular fibrillation
3/24	0.17	.08	90	Prolonged P-R, S-T depression has disappeared
3/25	0.15	.06	100	P-R shorter, T_3 positive and higher amplitude
3/26	0.12	.04	140	P-R reduced, S-T II, III depressed since 3/25
3/27	0.12	.06	120	High P_2
3/28	0.15	.03	130	P_2 emphasized
3/29	0.12	.03	120	Supraventricular tachycardia
3/30	0.12	.06	120	T waves suggest myocardial damage
4/1	0.12	.06	134	T waves appear more normal
4/3	0.12	.06	155	Increase in rate, T_4 higher
4/4	0.12	.06	150	No change
4/8	0.12	.06	150	T_1 shows increased amplitude

domen distended, temperature may be elevated, dependent edema may develop and X-rays of the chest may show cardiac enlargement and pulmonary edema. The usual episodes are characterized by abrupt transitions from normal rhythm to tachycardia and back to normal rhythm.

Etiology

In older children the general opinion is that congenital heart disease is the most common cause of paroxysmal tachycardia. In infants the etiology is uncertain, although infection or congenital heart disease are probably the two main etiologic factors involved.

Treatment

The mechanical stimulating measures such as arterial pressure, carotid sinus pressure, anal dilatation and sudden inversion have come to be regarded as of little value therapeutically. The administration of acetylcholine salts, pilocarpine, quinine and quinidine give varying results. On one thing most workers will agree, however, that digitalis is the treatment of choice and nearly every case will respond to its administration. In those cases of recurrent attacks of tachycardia a small maintenance dose of digitalis and occasionally a small maintenance dose of quinidine will give prompt return to normal rates.

In the use of mecholyl, which Hubbard found somewhat effective in older children, alarming circulatory failure with collapse occasionally developed. Atropine was used as the antidote.

The initial dose of digitalis may vary from 0.05 to 0.1 gram of digifoline intramuscularly and repeated doses of 0.05 gram may be given daily as needed, especially if there is a tendency toward recurrence of the paroxysmal tachycardia.

Cedilanid in a dosage of 0.5 mgm. daily, orally or intramuscularly combined with quinidine, 10 mgms., three times daily, was used successfully in our own case.

Conclusions

1. A case of paroxysmal tachycardia and cardiac decompensation in an infant is presented which was treated successfully with digitalis and quinidine.
2. Paroxysmal tachycardia is probably less rare than originally supposed.
3. Digitalis, followed by quinidine, is the treatment of choice.
4. The diagnosis of paroxysmal tachycardia depends upon suspecting the condition and taking serial electrocardiograms when symptoms persist.

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Editorials

MISINFORMATION PLEASE

When a physician is a guest at a dinner party he does not want to talk shop, but how is he going to avoid it? It is considered rude not to answer questions. He can but sit patiently and murmur polite but indistinct replies to the battery of questions which assail him from all directions. "Celery is good for you, isn't it, Doctor?" "You shouldn't drink water with your meals, should you, Doctor?" Questions of this type usually accompany the first course.

As the meal progresses, the subjects grow more serious and the physician, as a rule, has the opportunity to catch up on the latest misinformation. He hears first from one side, then the other, such statements as, "Oh, no, she didn't have scarlet fever, she had scarlatina," "a seven-month baby lives but not an eight-month," "as long as a mother nurses her child, she cannot conceive," "when 'shingles' goes completely around the body and meet in the middle, it is fatal," "if a pregnant woman bends over at the waist without bending the knees it is sure to wrap the baby's cord around the neck and is liable to choke it to death."

When we recall that John Hunter, 1728-1793, had the erroneous belief that gonorrhea and syphilis were identical diseases and this idea prevailed until it was overthrown by Philippe Ricard, 1799-1889, we can afford to be charitable toward our lay friends of 1947. After the preliminary introduction and a more accurate orientation, "What kind of a doctor are you?" you may be forewarned further by the gleeful outburst, "Here's where I am going to get some free advice." If you would escape a pedantic dissertation on pseudoscience interspersed with fusilades of an embarrassing inquisition to change the monotony, this is the time to negotiate with adroit strategy your table companions, and if you are fortunate enough to find seating between disciples of Mary Baker Eddy who "do not believe in sickness" you may experience a heavenly calm. On vacations the wife should be admonished against titular introductions. It is grand to be called "mister" now and then; Tom, Dick and Harry are good names and Axel will do in a pinch.

A. E. H.

THE AMERICAN LEGION RESEARCH PROFESSORSHIP IN RHEUMATIC FEVER AND HEART DISEASE IN CHILDREN

The Minnesota Department of the American Legion is to be commended for its pioneering spirit and its wisdom in undertaking to raise a permanent endowment fund to establish a research professorship in rheumatic fever and heart disease at the University of Minnesota Medical School. The public announcement of its intention to make this significant contribution toward the ultimate solution of the knotty problem of rheumatic fever has met with spontaneous approval throughout this area and elsewhere.

Members of the medical profession, who are most familiar with the ravages of this disease, can be depended upon to give their enthusiastic support and encouragement to the Legionnaires and other public-spirited citizens who undertake to carry this unique and forward-looking program to a successful conclusion. The well informed practicing physician is quite naturally the public's chief source of reliable information pertaining to medical matters because he is constantly answering queries posed by his patients or is voluntarily proffering advice concerning the rules of health for their guidance. Enthusiastic members of the Legion are, therefore, likely to call upon the doctors in their respective communities for up-to-date information regarding the subjects of rheumatic fever and heart disease and for some explanation of the need for an all-out scientific attack on the unsolved problems of etiology and therapy. That any member of our profession would fail to give his wholehearted cooperation to such a worthy cause is, of course, unthinkable.

The project of endowing a permanent research professorship in rheumatic fever and heart disease at the University of Minnesota, now referred to as "The Minnesota Plan," was an outgrowth of the American Legion's nation-wide health program. Learning that the unspectacular disease, rheumatic carditis, is now responsible for more deaths among American children between the ages of five and sixteen years than are the six most dreaded contagious diseases taken together, the Legion resolved to meet this grim challenge by concentrating the major efforts of its long-established child welfare program on an unremitting campaign for the ultimate eradication of the affliction. In addition to supporting special case-finding clinics, organizing clinical conferences and carrying on a general educational program, the organization has recently created several special research fellowships for young physicians interested in the field. Each Legion department and post is free to attack the problem in the manner most appropriate for its local needs and facilities.

When officials of the Minnesota Department of the Legion surveyed their local situation, it became obvious that the latter was unique in some respects, particularly as regards professional interest in the subject and facilities already in use or soon to be made available at the State University. The Variety Club of the Northwest had succeeded in raising sufficient funds to insure the building of the special hospital for patients suffering from rheumatic fever and heart disease on the University campus. Financial support for the maintenance of this institution with both in-patient and out-patient services was assured in advance by State and County appropriations, by the Eustis endowment fund for the medical care of sick children, by annual contributions pledged by the Variety Club and by income from a limited number of pay patients. Two full teams of clinicians composed of specially trained surgeons, cardiologists and pediatricians were already obtaining very encouraging results from the surgical treatment of children with various forms of congenital heart disease.

Even with the best clinical facilities thus provided, with widespread professional interest in the unsolved problems of rheumatic fever and heart disease, with consulting specialists in all branches of medical science close at hand in the Medical School, and with many young veteran doctors and medical graduate students available to assist in research, there was still one outstanding need to be supplied in order to establish an ideal program. This was the provision for a highly trained, full-time scientific investigator under whose guidance well coordinated research projects could be formulated and carried out. It is this latter need that members of the Minnesota Legion hope to supply by endowing a research professorship in perpetuity at the University. The new Mayo Memorial and Variety Club Heart Hospital buildings will provide ample laboratory and office space for the purposes described. The Northwest will then have a center for research and dissemination of knowledge in this field which will be second to none.

I. M.

RECURRENCE OF INFECTIONS FOLLOWING CHEMOTHERAPY

Accumulating clinical and bacteriologic evidence now reveals a serious inadequacy in our criteria for cure with chemotherapy. The latency and recurrence of infection resulting from this difficulty may in some instances be only an annoyance while in others it may prove to be critical.

Rothman[1] reviewing some of the recorded observations states the difficulty as being one "due to the rapid disappearance of all clinical evidence of the disease before a cure has been completed."

Two dangers pointed out by Spink and Hall[2] are that an infection may be controlled but not eradicated and that drug-resistant strains may result. Relapses in meningitic disorders[3] are especially apt to lead to Hydrocephalus and irreparable brain damage. Single injections of penicillin in most infections is totally inadequate and some authorities have recently questioned the alleged persistence of high penicillin levels even for relatively short periods after "oil" injections.

Weinstein and Atherton[4] have reported sinus phlebitis occurring in the course of penicillin therapy of otitis media. Absence of pain, chills, temperature, and blood reactions can lead to a false sense of security. Herrell[5] has stated "It is necessary to bear in mind the masking effect of penicillin and exceeding caution is required to avoid becoming too assured of good final results when the striking symptomatic response has been secured. Premature assurance may permit an infection of low grade which requires surgical intervention to develop into a dangerous infection. The masking effect of penicillin is similar to, if not more pronounced than that exerted by sulfonamides."

Appelbaum and Nelson[6] reported seven relapses in 67 cases of pneumococcic meningitis. The incidence of relapse in ambulatory patients in private practice is probably greater than in hospitalized patients who enjoy the benefit of more careful supervision.

Cultures of the blood or spinal fluid may yield negative results with a relapse imminent while positive throat cultures not infrequently occur in the carrier who is clinically well from respiratory disease. Sedimentation tests have proved unreliable as an index of cure because of a lag which may last many weeks.

Duration of treatment must therefore rest on clinical grounds principally, the exception being those few cases where sensitivity tests may be done with antibiotics. In meningococcic infections treatment is usually continued for about five to seven days after sterile culture and absence of symptoms. In pyogenic meningitis about ten to fourteen days is the usual period. In scarlet fever experience has taught us to persist for twelve days minimum with sulfonamide.[7]

As the optimum dosage, interval and method of administration become more generally understood it is hoped that relapses will become less frequent.

E. S. P.

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THE USE OF DARROW'S SOLUTION IN DIARRHEA*

Diarrhea in young infants with its disturbance in the acid-base balance and dehydration is still a challenging problem as far as treatment is concerned.

Darrow states that no fundamental new principle in the treatment of diarrhea has been introduced in the last twenty years. The distribution of electrolyte in the intra- and extracellular fluids was considered to depend mainly on the exclusion of sodium and chloride from the cells and the relative impermeability of cellular membranes to potassium. In the past few years it has been demonstrated that both sodium and chloride are found in appreciable amounts in intracellular fluids and that sodium and potassium readily cross the cellular membranes.

Balance studies were done by Darrow: (1) to obtain the actual retentions of the extra- and intracellular ions during recovery from dehydration due to severe diarrhea. Water, chloride, sodium, and potassium were found to be retained in all cases during recovery from diarrhea indicating the probable deficits produced by diarrhea. A considerable loss of intracellular potassium was a prominent feature in all cases—in the most severe cases the loss was equivalent to about one fourth of the estimated body potassium. It was also demonstrated in one case that while sodium bicarbonate in the treatment of certain types of acidosis will restore the serum concentration of bicarbonate, it may aggravate the disturbance in the intracellular fluids.

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*Material contained in this article is essentially a compilation of facts published in the various papers of Dr. Daniel Darrow. From the University Pediatric Teaching Service, Northwestern Hospital.

On these observations a new method of treatment is based initiated by D. C. Darrow and C. D. Govan, Jr.[2] This new solution which they used contains potassium in addition to other electrolytes used in the conventional therapy of dehydration. It is a potassium chloride—sodium chloride—lactate mixture containing potassium at about ten times the normal concentration of potassium in extracellular fluids.

K Cl	gm. 2
Na Cl	gm. 3
Molar sodium lactate	40 cc.
Water	710 cc.
or 1/6 molar sodium lactate	250 cc.
and water	500 cc.

The solution can be autoclaved or the potassium and sodium chloride can be sterilized separately by dry heat and added to the water.

It is well known that loss of body water and electrolyte leads to shock. Darrow[3] points out that in clinical dehydration there is practically always a deficit of extracellular electrolyte, and that this may or may not involve gross deficit in total body water. Also that loss of extracellular electrolyte usually involves a decrease in plasma volume and a tendency to lose plasma proteins.

It is, therefore, important to give whole blood or plasma as well as salt solutions in the initial treatment of severe dehydration due to diarrhea. It is also known that in severe dehydration there is a marked decrease in glomerular filtration which accounts for the oliguria which is observed in severely dehydrated patients and which may lead to complete anuria if shock is present.

It has been observed that dehydration is usually accompanied by a relatively greater loss of sodium and chloride than of water which results in a decrease in the concentrations of extracellular electrolyte. This disturbance is probably corrected partly by the kidneys which tend to restore the concentrations to normal by excreting water.

It is particularly important to improve the circulation and restore the renal function when potassium is administered. The normally functioning kidneys are capable of excreting potassium in a considerable concentration and thus prevent a dangerous rise in the potassium concentration. The excreted potassium is eliminated in the urine, which is under normal conditions about 90 per cent.

Oral administration of food and water was withheld until all evidence of dehydration was overcome and intestinal absorption was partially restored in the cases reported by Darrow.

In order to replace the deficit of body water and electrolyte 80-150 cc. of this new solution per kilogram of body weight are given during the first twenty-four hours. This is administered subcutaneously in a slow drip in eight to twelve hours. During this period enough 5 per cent glucose is given intravenously to make the total fluid intake adequate—the amount depending on the severity of the diarrhea.

After the first twenty-four hours, both the total fluid administration and the amount of the potassium containing solution can be decreased. From 20 to 50 cc. per kilogram of body weight may be given of this new solution and this may be continued as long as stools are watery, making up the total fluid requirements with 5 per cent glucose. When stools are no longer watery, oral feedings may be started using equal parts of powdered whole lactic milk and powdered skim milk restored to original volume with water. Feedings are increased gradually starting with only 10 calories per kilogram of body weight. One to two grams of potassium chloride may be added to each day's feeding if caloric intake is less than 70 cal. per kg.

The use of potassium therapeutically is not without danger, as it has an inhibitory effect upon the heart. Intoxication may occur if the concentration of the potassium ion in the extracellular fluid is excessively elevated.

Heart block may occur and should be looked for. It has been shown that patients with impaired renal function are more apt to get potassium intoxication. It is, therefore, very important to improve the renal function and assure the excretion of urine before potassium therapy is started.

Potassium intoxication with heart block should be treated with calcium gluconate intravenously to counteract the inhibitory effect of potassium on the heart. In some cases a generalized erythema develops after two to three days of this treatment with subsequent desquamation of the skin.

The results of this treatment reported by Darrow are remarkable. The mortality rate in his series was lowered considerably (from 25 per cent to 5 per cent), but the duration and intensity of the diarrhea was apparently not altered.

H. A.

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2. Darrow, D. C., and Govan, C. O.: Use of Potassium Chloride in Treatment of Dehydration of Diarrhea in Infants. J. Pediat., 28:541-549 (May) 1946.

3. Darrow, D. C.: Medical Progress; Body Fluid Physiology; Relation of Tissue Composition to Problems of Water and Electrolyte Balance. New England J. Med., 233:91-97 (July 26) 1945.

EARLY IMMUNIZATION AGAINST PERTUSSIS

It has long been thought that children under the age of six months were unable to form humerol antibodies against certain specific infectious diseases. The disease which we as physicians are especially concerned with in early infancy is whooping cough, since it is the cause of a large mortality. This disease not only kills but may produce chronic pulmonary infection and encephalomyelitis in a large number of the group affected. Because we have been unable to justify early immunization against pertussis, until the development of the hyperimmune sera in the last decade, the disease ran its course almost unchecked. Recently Sako and associates [1] at the Charity Hospital, New Orleans, treated 3793 young infants between two and twelve weeks with 0.2, 0.3, and 0.5 cc. alum precipitate vaccine containing 40 billion pertussis bacilli per cc. at monthly intervals. The young infants tolerated the inoculation extremely well. The agglutination tests showed that the greatest amount of immunity was present three to four months after the series of injections had been completed and, that 63 per cent of the individuals tested after twenty-four months were still immune.

The authors conclude that "the fact that 75 per cent of these very young infants exhibited antibody response as measured by the agglutination tests used, is evidence of the value of immunization early in infancy. This is contrary to the popular belief that young infants are unable to elaborate antibodies following active immunization, and the question of early immunization against pertussis should be re-opened for consideration by the profession." Although Sako's work has not had time to be repeated in any large numbers it merits our consideration at this time. One could, in the light of the above findings, begin immunization against pertussis at three or four months and give a recall or "booster" injection at twelve months of age to increase any subsiding immunity at that age.

Because of the occurrence of abscesses following immunization with triple vaccine (diphtheria-pertussis-tetanus) in infants one must suggest that it be temporarily abandoned for the younger child and that after early immunization against pertussis, immunization against diphtheria and tetanus using combined toxoid, be started at six months. When attempts are made to "boost" pertussis, diphtheria, and tetanus at the age of five or six years, one can use the triple toxoid with relatively negligible reactions.

In summary, an ideal immunization schedule would begin with smallpox vaccination at the age of three months, then proceed with whooping cough immunization at the fourth, fifth and sixth months, and diphtheria-tetanus toxoid at the seventh, eighth, and ninth months. A whooping cough booser should then be given annually and the final immunization would be three injections of diphtheria-tetanus, pertussis toxoid at five years of age. R. B. T.

Reference

1. Sako, W., Treuting, W. L., et al.: Early Immunization Against Pertussis with Alum Precipitated Vaccine. J.A.M.A., 127:379-384 (Feb. 17) 1945.

American Student Health Association

NEWS LETTER

Culver-Stockton College, Canton, Missouri, has applied for membership in the American Student Health Association. P. W. Jennings, M.D., is the Director of their Student Health Service.

Dr. John Gile has given up active practice and is no longer Director of the Health Service at Dartmouth College. Dr. Ralph Hunter is now in charge of their Health Service.

The Student Health Service at the University of Nebraska, Lincoln, Nebraska, is now undergoing a complete reorganization and has again been placed into medical hands. Dr. S. I. Fuenning is Director of the Student Health Service.

STUDENT HEALTH PRACTICES

Practice in Prevention of Acute Illness

In reply to an inquiry sent out by the Secretary, Dr. Ruth E. Fairbank made the following practical observations on the use of the infirmary at Mt. Holyoke College, South Hadley Massachusetts:

"We believe that our system of house excuses has been one of our most successful methods of preventing epidemics. Any student who does not feel well is urged to report to the Head of her house who has the authority to give her a "house excuse" and keep her in bed for 48 hours if necessary. If the student has any fever, she is visited by the nurse or one of the physicians and sent to the Infirmary when symptoms indicate an acute infection. A good many simple colds as well as fatigue, dysmenorrhea, or temporary gastro-intestinal upsets are cared for in this way in the dormitory. We feel that the immediate rest and partial isolation in bed definitely reduces the spread of infection.

One of our most challenging problems at Mount Holyoke College is the size of our infirmary. We have only 13 beds and a community of almost 1200 students (about 1500 including faculty and staff, but we are very rarely able to take one of them in the infirmary).

In spite of this limited capacity for care, we have had no epidemic in many years and very seldom, if ever, have to leave a really ill student in a dormitory for lack of a bed at the infirmary. It leaves a very narrow margin at times, but we do no major surgery there; the occasional surgical emergency we have is taken to a hospital in Holyoke or Springfield.

The limited space sometimes makes it difficult to follow out our mental hygiene policy of taking a student into the infirmary for a rest when she shows symptoms of nervousness from fatigue. If no room is available we make use of our house excuses in combination with discussions with a doctor about better organization of time for work and recreation and rest. While the small infirmary is a definite challenge to our ingenuity, we are none the less making a definite drive for a bigger one."

—L.C.

Announcements

Preliminary Program, Annual Meeting, North Dakota State Medical Association,

Fargo, May 25, 26, and 27

SCIENTIFIC PROGRAM

Ball Room, Elks Club, Monday, May 26th

9:00 to 9:45 A.M.—Registration. View exhibits.

9:50 to 10:00—Welcoming Address—The Honorable C. A. Dawson, Mayor, City of Fargo.

10:00 to 11:00—"The Treatment of Common External Diseases of the Eye," E. P. Burch, M.D., St. Paul, Minn.

11:00 to 12:00—"The Roentgenologic Contribution to the Diagnosis of Non-Neoplastic Disease of the Intestinal Tract," Harry Weber, M.D., Mayo Clinic, Rochester, Minn.

2:00 to 2:45 P.M.—"The Physiological Characteristics of Uterine Cancer in Relation to Radiation Therapy," James F. Nolan, M.D., Washington University, St. Louis, Mo.

2:45 to 3:00—Intermission. View exhibits.

3:00 to 4:00—"The Clinical Use of Antibiotics with Special Reference to Penicillin and Streptomycin," Wallace E. Herrell, M.D., Clinical Section, Mayo Clinic, Rochester, Minn.

4:00 to 5:00—"Chemotherapy in the Treatment of Syphilis Including Penicillin," Paul A. O'Leary, M.D., Section on Dermatology, Mayo Clinic, Rochester, Minn.

Tuesday, May 27th

9:00 to 9:30 A.M.—View exhibits.

9:30 to 10:30—"Diagnosis and Treatment of Acute Vascular Occlusion of the Extremities," N. W. Barker, M.D., Clinical Section, Mayo Clinic, Rochester, Minn.

10:30 to 10:45—Intermission. View exhibits.

10:45 to 11:30—"Peripheral Vascular Disease and the General Practitioner,"—H. O. McPheeters, M.D., Minneapolis, Minn.

11:30 to 12:15—"Common Errors in Protologic Diagnosis and Treatment," W. A. Fansler, M.D., Minneapolis, Minn.

2:00 to 2:30 P.M.—Presidential Address—A. E. Spear, M.D., Dickinson, N. D., President, North Dakota State Medical Association.

2:30 to 3:30—"Cardiac Emergencies and Their Treatment,"—Moses Barron, M.D., Minneapolis, Minn.

3:30 to 3:45—Intermission. View exhibits.

3:45 to 4:45—"Differential Diagnosis and Treatment of Abdominal Pain in Infants and Children," Oswald S. Wyatt, M.D., Minneapolis, Minn.

Special Society Meetings

NORTH DAKOTA HEALTH OFFICERS ASSOCIATION

Program to be announced.

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

Program to be announced.

NORTH DAKOTA RADIOLOGICAL SOCIETY

South Room, Gardner Hotel

Monday, May 26th

12:15 P.M.—Luncheon for North Dakota Radiological Society's guest, Harry Weber, M.D., Mayo Clinic, Rochester, Minn.

NORTH DAKOTA SOCIETY OF OBSTETRICIANS AND GYNECOLOGISTS

Town Hall, Gardner Hotel
Monday, May 26th

12:15 P.M.—Luncheon. Program following Luncheon: Round Table Discussion headed by James F. Nolan, M.D., Washington University, St. Louis, Mo.

NORTH DAKOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

28th Annual Meeting — Monday, May 26th

Colonial Room, Gardner Hotel

12:15 P.M.—Luncheon. Program following Luncheon: "Safeguards in Cataract Surgery"—illustrated lecture by Edward P. Burch, M.D., St. Paul, Minn. Case Reports.

GENERAL LUNCHEON

Tuesday, May 27th

Town Hall, Gardner Hotel

12:30 P.M.—Luncheon. Program: Round Table discussion on the subject of varicose veins and allied conditions, headed by H. O. McPheeters, M.D., Minneapolis, Minn.

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Preliminary Program, Annual Meeting, South Dakota State Medical Association

Rapid City, May 31 - June 1, 2, and 3

Saturday, May 31st

6:30 P.M.—Exhibitors Dinner, East Ballroom, Alex Johnson Hotel.

8:30—Council Meeting, Room 304, Alex Johnson Hotel.

Sunday, June 1st

1:00 P.M.—Preview of Exhibits, City Auditorium.

1:30—House of Delegates Meeting, City Auditorium.

5:00—Recreation.

6:00—Stag Party, Canyon Lake Tavern.

Monday, June 2nd

8:45 A.M.—General Session, First City Auditorium.

12:15—Luncheon Meetings, Alex Johnson Hotel.

2:00—Second General Session, City Auditorium.

5:00—House of Delegates Meeting, City Auditorium.

7:00—Annual Banquet.

9:00—Council Meeting, Room 304, Alex Johnson Hotel.

Tuesday, June 3

8:00 A.M.—Council Meeting, Room 304, Alex Johnson Hotel.

8:45—Third General Session, City Auditorium.

12:15 P.M.—Luncheon Meetings, Alex Johnson Hotel.

2:00—Fourth General Session, City Auditorium.

SCIENTIFIC PROGRAM

City Auditorium

"Some Clinical Aspects of Poliomyelitis," "The Role of Nutrition in Immunity," John A. Anderson, M.D., Universtiy of Utah Department of Pediatrics, Salt Lake County Hospital.

"The Treatment of Severe Asthma," C. K. Maytum, M.D., Consultant in Medicine, Mayo Clinic.

"Diagnosis and Treatment of Some of the More Common Skin Diseases," Helen Jane Hare, M.D., Department of Dermatology, Mayo Clinic.

"Carcinoma of Lung," "Venous Thrombosis," Alton Ochsner, M.D., Chief, Department of Surgery, Tulane University.

"Clinical Pathological Conference," John S. Howe, M.D., Director of Laboratories and Pathologist, Methodist Hospital.

"Clinical Talk on Stumbling Blocks in Fracture Work," F. E. Clough, M.D., Orthopedic Consultant.

"Climate as a Major Factor in the Degenerative and Metabolic Diseases," "Climate and Resistance to Infection," Clarence Mills, M.D., Professor of Experimental Medicine, Cincinnati General Hospital.

"Use of Isotopes in Medical Investigation," John H. Lawrence, M.D., Assistant Professor of Medicine, University of California.

"Continuous Follow-up Study of Arthritics," "Routine Studies and the Non-articular Aspect of the Arthritic," H. Archibald Nissen, M.D., Boston, Massachusetts.

"Replacement of Fluid Losses Associated with Operation and Trauma," "Carcinoma of the Colon," Frederick A. Coller, M.D., Chief, Department of Surgery, University of Michigan.

"Rural Health," J. C. Jones, Minnesota Farm Bureau Federation (speaking at annual dinner).

"The Treatment of Common External Diseases of the Eye," Edward P. Burch, M.D., University of Minnesota.

Deaths

Dr. Daniel F. Clancy, 70, died February 5 at Ennis, Montana, where he had practiced for 25 years.

Dr. Charles B. Rodes, 67, of Butte, Montana, died March 31. He was president of the Murray hospital from 1937 to 1945, and had practiced in Butte for over 30 years.

Dr. James O. Lee, 78, who had practiced in Sioux Falls, South Dakota, for 10 years, died there February 22.

Dr. Roy G. Stevens, 66, Sioux Falls, South Dakota, died February 20. He had practiced in Sioux Falls since 1909 and for 13 years was president of the Sioux Falls Medical and Surgical Clinic.

Dr. George A. Talbert, 81, for 20 years professor of physiology at the University of North Dakota, died April 3 at Fargo, North Dakota.

Dr. Clifford G. Salt, 65, a practicing physician in Minneapolis for 25 years, died February 12.

Dr. C. C. Blakely, 71, died March 26 at Barnum, Minnesota, where he had practiced since 1920.

Dr. Robert Turnbull, 72, Fosston, Minnesota, died March 30. He had practiced there since 1905 and was founder of the Fosston hospital.

Book Reviews

The Compleat Pediatrician, by W. C. DAVISON, M.D.; 5th edition. Durham: Duke University Press, 1946. Pp. 256. $3.75.

- - - - - - -

This book is one of the most popular of the smaller monographs in the field of pediatrics. The previous editions have received great praise from the reviewers of all medical journals. Students, general practitioners, pediatricians, other specialists, and teachers have all made extensive use of the book. There is not much one can add to the recommendations which have already been made. The fifth edition brings the practical diagnostic, therapeutic and preventive measures in pediatrics up to date.

The contents include diagnosis, children's diseases, treatment, fluid and blood administration, feeding, diets and nutrition, drugs and prescriptions, laboratory tests, preventive measures and child care, growth, development and guidance of children, and instructions for taking histories and making physical examinations. The monograph should be in the office of every physician.

A. V. S.

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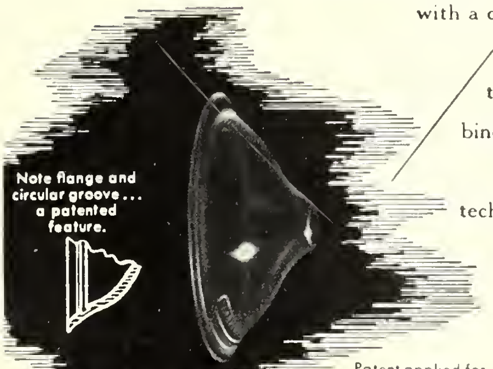

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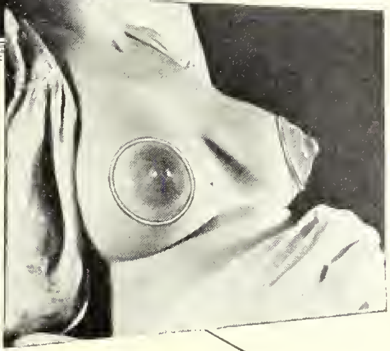
U S Patent Office



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Advertisers' Announcements

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In the interest of breast feeding over formula feeding, and to aid mothers with inverted, short or abnormally formed nipples which babies grasp incorrectly, the Hutson Nurseze nursing shield has been devised. With over 16 months favorable experience in Minneapolis and St. Paul hospitals, it has been found that multiparas have been able for the first time to nurse infants. In most cases they could obtain 3 ounces or more of food.

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The JOURNAL LANCET

Minneapolis, Minnesota
June, 1947

Vol. LXVII, No. 6
New Series

Foreword

The Minneapolis Chest X-Ray Survey

Conducting a chest X-ray survey of all the adults of a city of a half million population is a tremendous undertaking.

This dream of Dr. Frank Hill, City Health Commissioner, was first proposed at an Executive Committee meeting of the Hennepin County Medical Society. That it received the enthusiastic approval of the Medical Society is a tribute to Dr. Hill, and demonstrates the interest of the society and the medical profession in public health and the tuberculosis control problem.

With the approval of the Board of Public Welfare, Dr. Hill then applied through the State Board of Health to the United States Public Health Service, for their active participation in the venture. Upon official notice that this aid was forthcoming, local organizaion and planning were started.

The Hennepin County Medical Society and the Hennepin County Tuberculosis Association assumed the sponsorship of the survey. A small executive committee with Dr. E. J. Huenekens as Chairman was appointed by the Mayor, with the approval of the Board of Public Welfare, to take official control of the administrative planning and details of operation of the program. A larger committee of leading lay and professional people was appointed in an advisory capacity.

Dr. Clare Gates, Assistant City Health Commissioner, was appointed executive director for the project. Under his able guidance, an impressive lay organization was formed encompassing the entire city. United in this effort are groups from the associations of commerce, labor unions, banks and business houses, the press and radio, schools, churches and other interested organizations. Local district committees and block workers are acting to contact every home, preceding the arrival of an X-ray unit in the neighborhood. No one will have to go more than four blocks from his home to have an X-ray taken. A committee has arranged with large factories and other large business houses for X-ray of employees.

A prominent businessman, Mr. O. J. Arnold, who has shown great interest in community progress, is acting as General Chairman of the entire survey.

The Dr. J. W. Bell lectureship, sponsored each year by the Tuberculosis Association and the Medical Society, was this year designated as the opening signal to start the actual survey. It was especially appropriate that the speaker on this occasion was Dr. Herman Hilleboe, the Assistant Surgeon General of the United States Public Health Service. This distinguished Minnesotan, from his vast experience as Chief of the Tuberculosis Service of the Federal Government, gave a most complete picture of the problems of modern tuberculosis control in its relation to the private doctor.

The response of the public up to this time has kept the nine X-ray units constantly busy. However, the percentage of coverage of the adult population cannot as yet be estimated.

Of more specific interest to the medical profession and of greatest importance in any chest survey are the provisions for further diagnostic procedures and medical care for those found with X-ray evidence of chest or heart lesions.

A Medical Technical Committee, consisting of doctors representing the Medical Society, the Tuberculosis Association, the Minneapolis Health Department, the Minnesota Board of Health, and the Medical School of the University of Minnesota, along with some public health nurses, has met on several occasions. Dr. William Roemmich, the Tuberculosis Control Officer of the Health Department, as secretary, has aided greatly in all committee and sub-committee meetings.

The committee realized from the start that any community conducting so comprehensive a survey would quickly overload available county sanatorium facilities. Our well-equipped and well-run Glen Lake Sanatorium has had to close some floors, due to a shortage in available nursing personnel. With advent of the survey, Dr. E. S. Mariette, the Superintendent, has had to limit admittances to the infectious cases and to those cases where operative collapse surgery is contemplated.

It is evident that many early cases, and even other active cases, will have to be isolated and treated at home. Of greater importance, however, is the fact that most of the diagnostic work in X-ray positive cases, usually taken care of by the sanatorium, will of necessity rest with the private doctor and the chest clinics.

Increased financial aid to enlarge sanatorium facilities and to provide more adequate medical and nursing personnel should be sought from the county government without delay.

The Technical Committee realized that increased laboratory facilities for sputum smears and cultures of sputums and gastric washings will need to be provided. Such arrangements have been made through the State Board of Health and the City Health Department. Provisions are being arranged for ambulatory gastric washings at the Public Health Center, and for over-night hospitalization and morning gastric expression at Glen Lake Sanatorium. These services to private patients are to be arranged for by the doctor with the Tuberculosis Control Office of the City Health Department.

As in the past, Koch's old tuberculin will be supplied to the doctor by the Tuberculosis Association. Upon application of clinic or doctor, PPD can be supplied.

The committee has devised and approved the report forms to patients and to the doctor. The reporting of tuberculosis cases by the doctor is required by law, but we are asking for the report of *all* lesions of the chest or heart. These accumulated findings should be of great medical scientific interest.

When chest shadows are found on the small 70-milliampere film, repeat X-rays, using 14" x 17" film, will be made before a report is sent to the doctor. All reported roentgenographic findings will be from the larger film, except in cardiac enlargements.

From this survey will be found tuberculosis in all of its phases, from the healed lesion to the most active. Only by correlating X-ray reports with history, symptoms, physical examination, and laboratory findings can determination of activity and infectiousness be made. Differential diagnosis of the various chest and heart lesions are often difficult and tax the skill of even the most expert.

At the request of the Technical Committee, this issue of the JOURNAL-LANCET is especially devoted to the problems in follow-up procedures. It was thought that a publication such as this would be of great help to all physicians concerned with that part of the Minneapolis chest survey. It may also be of assistance to the profession of any other city or community where chest X-ray surveys are contemplated.

CHARLES E. MERKERT, M.D.,
Chairman, Medical Technical Committee,
Minneapolis Community-wide Chest X-ray Survey;
Chairman, Public Health Committee,
Hennepin County Medical Society.

Community-wide Chest X-Ray Surveys and the General Practitioner*

Herman E. Hilleboe, M.D.†
Washington, D. C.

Any carefully planned program of control recognizes and uses the important talents and the strategic community position of the general practitioner. Indeed, it must be said that the physician in private practice is the principal force in the control of tuberculosis, and, certainly, in case-finding, as exemplified by city-wide X-ray surveys, there can be no question of the individual practitioner's significant contribution.

In a few communities, there has been expressed occasionally a certain apprehension concerning the effect of community-wide mass radiography projects on private practice. Experience, however, has demonstrated that newly discovered cases and their families go to their family physicians for supervision, advice, and care. Mass X-ray surveys discover a surprising number of early cases that, though asymptomatic, require long-term follow-up and guidance.

Increased knowledge of the epidemiology of tuberculosis impels us to direct our attention not only to the individual tuberculous person, but to the community as a whole. Relatively few tuberculous persons in any community are discovered before symptoms develop, unless surveys are done, and fewer still come under the care of physicians experienced in diseases of the chest. One cannot tell how many other infectious persons are never seen by physicians. During lifetimes they are spreaders of disease.

Not only must such a program to find hidden infectious cases be extensive, it also must be intensive in action and limited in time. Indeed, one of the most interesting aspects of mass radiography programs is the time element.

It has been emphasized in recent years that the most effective method of controlling tuberculosis is by means of chest X-ray examinations of the adult population in a definite period of time. In an attempt to achieve this objective, the U. S. Public Health Service is assisting State and local health departments with equipment, personnel, and consultation.

The action prompted by this new technique has often been interrupted by confusion of public health principles, a condition occasioned by varying approaches to tuberculosis control.

One group believes that the single technique of examining contacts of known cases will discover all the new cases in the community. Another group advocates an annual tuberculin test of every person as the sole means of discovering all cases of tuberculosis. A third group, mostly epidemiologists, emphasize the damage done by hidden cases of tuberculosis and by their many unknown contacts, and urge a total assault on the disease by means of (1) community-wide X-ray surveys done within a deliberately limited period of time; (2) the concurrent establishment of adequate follow-up facilities and the examination of contacts of previously known and newly discovered cases; and (3) tuberculin testing of samples of the population at stated intervals.

Family studies and careful follow-up work in some of the best health departments in the country have shown that examination of contacts discovers as little as 25 per cent of new cases reported each year.

Annual tuberculin testing of the entire population of the United States accompanied by X-ray examination of reactors has been shown to be impracticable.

With full use of resources heretofore unrealized and with a resolute determination to wipe out tuberculosis as a social and individual problem, the large and small communities of the entire United States could be covered by mass radiography teams in less than five years' time.

Too often it is assumed that the control of tuberculosis is solely the health department's domain of action. This is not true, nor can it ever be true, so long as men practice the ancient art of medicine. The family doctor in the city, the country doctor going about from farm to farm, the village doctor in his office over the drug store know the people, have their trust, and guide their physical destinies.

Participation by the private physician in the control of tuberculosis need be no trouble in terms of time or technique. There are many ways in which the private physician can contribute his talents as a professional man and his influence as a community leader in any integrated program of control. The use of the intracutaneous tuberculin test or chest X-ray film on every new patient who has not been recently examined for tuberculosis should be a fundamental routine; this is a continuing and essential part of the community-wide plan. Reactors to tuberculin should have chest X-ray films made and interpreted by physicians with training in chest diseases. The general practitioner can get expert help from sanatorium physicians, chest specialists, and radiologists in his area on all routine chest films. Regularity of such conferences with more highly specialized colleagues will provide many opportunities to develop skills in the interpretation of films. Local health departments and tuberculosis associations can make special consultation service available for films of indigent patients.

It has been estimated that nearly 4 per cent of all persons who visit physicians' offices complain of cough or expectoration. The alert physician will insist upon a sputum examination of all such patients. Such practice will be rewarded by the discovery of tubercle bacilli in 3 or 4 out of every 100 specimens examined. The family doctor will fairly often discover to his astonishment, that a patient with slowly resolving pneumonia has an acid-fast reason for prolonged convalescence.

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*Condensation of the 13th Annual John W. Bell Lecture given April 28, 1947, in the Hennepin County Medical Society auditorium, Minneapolis.

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In less populous areas the general practitioner is required to carry on case finding and follow-up almost single handed. He must give advice and encouragement to his tuberculous patients and their families. Indeed, it is at this time that the practical philosophy of the private practitioner is of great moment—at the height that crisis which often occurs upon the announcement of tuberculosis. It is at this time that the general practitioner can bring all his talents into play. He is aware of the whole person. He knows the patient's background, habits, aspirations, and desires. He does not think of his patient merely as a pair of lungs; he thinks of a man of spirit as well as of body who for a time has come, through tuberculosis, upon disaster.

The private physician's interest and enthusiasm will increase and, as a result, his effectiveness as a worker in the community-wide program of tuberculosis control will grow if he takes the time to learn about some of the latest advances in this field. A few of the more noteworthy developments merit your attention.

Studies by Furcolow and co-workers have shown that there are great variations in human sensitivity to tuberculin and its products depending upon the dosage used and the characteristics of the population groups tested. Consequently proper interpretation of tuberculin tests requires a knowledge of the size of the dose and the type of product used.

It appears that the tuberculin sensitivity of patients suffering from active tuberculosis is at such a high level that the infection in these persons may be detected by the use of an exceedingly small dose of old tuberculin (OT) or PPD (purified protein derivative.) The authors point out that an intermediate dosage of approximately 1/10,000 mg. of the particular PPD used in their studies was sufficient to pick up a high proportion of infected persons. It is significant from the point of view of usefulness of tuberculin testing for determining infection rates and for differential diagnosis that both children and adults with active tuberculosis, almost always are reactors to tuberculin, except in the terminal stages of the disease.

Palmer and his co-workers have pointed out that one of the significant problems in tuberculosis involves the marked variations (in different parts of the country) of the frequency of pulmonary calcification observed in X-ray films of the chest especially among non-reactors to the tuberculin test. This is striking in view of the fact that pulmonary calcification is generally interpreted as evidence of healed tuberculosis. There is incomplete epidemiological evidence that tuberculosis is the only important cause of such findings.

About this time Christie and his group in Tennessee were concerned with the same problem. Christie had some children under care who were non-reactors to tuberculin and had pulmonary calcifications. These patients reacted to histoplasmin, the testing material prepared from the fungus, Histoplasma capsulatum. Preliminary reports from Palmer and his group indicate that (a) a mild probably sub-clinical infection with Histoplasma capsulatum (or immunologically related organisms) is widely prevalent in certain states and relatively infrequent in others, (b) that in general those states in which the frequency of reaction to histoplasmin is high are those in which pulmonary calcification is also high, but reaction to tuberculin is low, (c) that a high proportion of the pulmonary calcification observed in X-ray films of non-reactors to tuberculin is not due to tuberculosis. A recent study, based on an analysis of skin tests of siblings found among children who were lifetime residents of the metropolitan area of Kansas City, Missouri, is quite interesting because it demonstrates that there is a similarity of histoplasmin reactions among children of the same family. The percentage of reactors is higher among children whose older sibling does not react.

It was in the decade between 1935 and 1945 that students of epidemiology were provided with an important new instrument to assist them in their field investigations —the photofluorograph. Mass radiography made possible the examination of hundreds of thousands of people, in fact, whole communities, in a short period of time and at a reasonable cost.

Now that the X-ray machine goes to the people, and examines them in large groups, it discovers tuberculosis in its minimal stage in a high proportion of the cases found. The importance of this finding in controlling the disease is made clear by the fact that in recent years only 10 to 15 per cent of admissions to tuberculosis hospitals have been minimal cases . Today with new mass radiographic techniques 65 to 70 per cent of all cases found have X-ray evidence of minimal disease. Tuberculosis is at last being found when it can be relatively easily arrested; even infectious cases can be detected earlier and prevented from spreading their disease.

Mass radiography brought in its wake some troubling problems in the interpretation of X-ray films of the chest. Studies of Morgan and his coworkers who demonstrated that various film techniques—35 mm., 70 mm., 4" x 5", 14" x 17" paper, and finally the 14" x 17" celluloid film—are equally efficient in detecting practically all of the significant pathology present on X-ray films in the chest. Group work is now going forward to determine the human error in the interpretation of X-ray films of the chest. The ingenious technique developed by Yerushalmy for making comparative studies of various types of films read by several interperters is worthy of further use in other fields of science and public health. It avoids the use of one film and one reader as standards because either of these may have considerable variation themselves. If five readers use four different sized films (1 to 20 positives plus all 20 negatives) 21 combinations are possible. Yerushalmy uses 11 or more positives out of 20 readings as a standard.

Birkelo, Chamberlain and coworkers have demonstrated that the human error is great and that new techniques will have to be developed for the uniform detection of pulmonary pathology and that better classification will have to be devised to describe shadows on X-ray films. The error is of great moment in the epidemiology of tuberculosis, because the roentgenogram of the chest is the principal tool in diagnosis and follow-up of tuberculous persons. Great care must be exercised in making comparisons of epidemiological studies done by different investigators. Variations in results based solely on interpretations of X-ray films may be more apparent than real. For the present, if results are to be meaningful, comparative studies should include provision for interpretation of all chest films by two or more well trained interpreters, with careful evaluation of their independent readings.

Another subject which has attracted the attention of scientific investigators in the field of tuberculosis has been vaccination with the bacillus of Calmette and Guerin (BCG). The full effect of the vaccine on tuberculosis in human beings must wait until carefully controlled studies, precisely measure a reduction in morbidity and mortality in various age groups, for long periods of time. Where there is inadequacy or complete absence of isolation, lack of personnel and facilities for control and where persons, particularly children and susceptible racial groups are subject to massive exposures to tuberculosis, with little likelihood of any change, BCG vaccination should be given immediate consideration. The epidemiologist must still convince the clinician that prevention will contribute far more than treatment in the control of tuberculosis.

The brilliant discovery by Waksman in 1944 of the antibiotic, streptomycin, however, offers hope for suppressing pulmonary tuberculosis in human beings. It appears to have a definite but limited effect upon clinical progress of the disease; this includes retrogressive changes on the X-ray film, but only occasional changes from positive to negative sputum. The use of this new antibiotic for advanced cases of tuberculosis is of limited value because of the irreversible pathological processes that have already taken place. In most sanatoria throughout the country from 70 per cent to 90 per cent of first admissions have advanced disease. It is for this reason that Dr. Hinshaw of the Mayo Clinic estimates that not more than 10 per cent of patients now in sanatoria in this country would be likely to benefit by treatment with streptomycin, and then only if cases were carefully selected by experts in diseases of the chest. The Veterans Administration has treated over 50 cases with the remarkable record of one recovery out of every five cases; it is true that many of these had serious complications. The follow-up experience of these cases is awaited with interest.

Several questions about streptomycin merit consideration. Investigators find that after a four months' period of treatment with recommended doses of sreptomycin, the sputum still contains virulent tubercle bacilli in a considerable number of patients with advanced tuberculosis, even though there is some clinical improvement and retrogression of tuberculous lesions on X-ray films. Patients who are still infectious may wish to leave the hospital because they feel better, although their disease is not arrested. In this instance, streptomycin plays the dubiously beneficial role of temporarily helping the individual but permanently harming the community by causing the spread of the disease to uninfected contacts. Furthermore, laboratory studies have been shown that persons kept on treatment with streptomycin for even short periods of time, develop strains of tubercle bacilli that become resistant to streptomycin but still retain their virulence. The longer the patients are treated the more likely this is to occur. Epidemiologically, a dangerous situation could be created that would retard rather than hasten the control of this disease. Careful study will have to be made of these factors before such a drug is used widely throughout the nation.

As Dr. Hart of England points out, there is, at present, insufficient evidence concerning the use of chemotherapeutic agents in tuberculosis to warrant any cessation of the successful campaign to provide more beds from the isolation and treatment of persons with infectious and remediable disease. Actually, when a successful therapeutic agent emerges, as it undoubtedly will, additional personnel, beds and other facilities must be available for the most effective use of such an agent.

Laboratory examinations for tubercle bacilli are in somewhat the same untenable position in the United States today that serological tests for syphilis were at the beginning of the venereal disease control program over a decade ago. There is no general agreement of the most effective media for culture of tubercle bacilli in the routine or research laboratory. Yet no subject is of greater significance in the epidemiology of tuberculosis than the detection of virulent tubercle bacilli in persons suspected of or having the disease. Sputum examination is essential for exact diagnosis; prognosis rests largely on its accuracy; infectiousness is determined solely by the presence or absence of infecting organisms in bodily discharges. Much of our present knowledge of epidemiology has come from combined clinical and laboratory investigations. Without the results of laboratory tests, the clinician would find it difficult to diagnose accurately, predict realistically, and treat effectively a high proportion of his patients.

To determine the effect of sanatorium care or surgery on the natural history of tuberculosis in a given population group, high standards of laboratory diagnosis must be observed; otherwise such studies are likely to become a series of unassociated case histories. Many of the reports of the results of surgical treatment of tuberculosis of the lungs suffer from a paucity of evidence concerning reversion of positive to negative sputum because of lack of laboratory controls.

The easily performed procedure of pneumothorax is often initiated before tubercle bacilli are demonstrated in the pulmonary discharges or the pleural fluid. Epidemiology teaches us that all shadows on the X-ray film are not tuberculosis. All the wisdom and judgment of an experienced chest clinician must be utilized before interfering with the normal physiology of the respiratory system. The possible advantages of surgery must be carefully weighed against the dangers of interference with restoration of normal function, by the body itself.

From the X-ray film alone even the experts can not consistently distinguish the fibroid from the exudative type of pulmonary lesion. Prolonged study in a hospital by experts often offers the only solution to this difficult diagnostic problem. Yet the truth is, there are not sufficient beds in the United States to hospitalize all the minimal cases now being discovered, in increasing numbers, by mass radiography of the adult population. What is to be done in the meantime? Supervise the minimal cases that can not be labelled active clinically, and use the hospital beds for those minimal cases of uncertain or active status and for the more advanced infectious cases.

The problem of proper disposition of a person with a minimal lesion requires further appraisal and research. Frequent repetition of X-ray and laboratory examination should be the rule. Abnormal pulmonary findings of any kind that appear on serial study should be carefully scrutinized in the doctor's office or public clinic so that even the slightest signs may be studied for possible evidence of activity. If such a practice is generally followed, chest physicians will gain in skill of diagnosis; limited hospital resources will be conserved for urgent cases; and epidemiology will assume added significance.

The unsolved problem of hospitalization of the tuberculous in this country poses many questions. In recent years over one-third of all deaths from pulmonary tuberculosis occurred outside of hospitals and institutions.

Control of the disease will be impeded until a more realistic distribution of hospital facilities is accomplished. Tuberculosis does not respect state lines, color, race, or creed. The real value of case finding is measured by the number of infectious cases that are given isolation and thereby prevented from spreading infection to others.

How can the limited number of hospital beds be used to greatest advantage? It is suggested that positive sputum cases be separated into two groups: First, the positive sputum case with remediable disease; second, the positive sputum case that has little hope of recovery. Hospitalize first the remediable positive sputum group. In this way both isolation and treatment are accomplished. The irremediable positive sputum case might be isolated in a single room in a general hospital during the terminal episode. In the event that such arrangements are impracticable, the hopeless case must be cared for in the home under the best possible isolation technique, with home instruction and contact follow-up by public health nurses. Such a practice protects the community and provides the opportunity to restore the health of at least some whose disease is not yet beyond repair.

We must think of the community first and the individual next when hospital beds are limited. We must guard the health of all the known tuberculous in the community and not just the individuals who, often by chance, fall into the hands of the expert in chest diseases. Available beds should be used principally for the spreaders of tuberculosis whose lesions can be arrested, and for proved minimal cases with definite clinical or laboratory evidence of active disease. This is in accord with changing social views on illness. It is becoming more and more widely recognized that a tuberculous patient is not only a private patient under the care of a doctor but also a carrier of a disease in the community. Therefore, the physician has a certain public as well as private responsibility. The private physician must report all his tuberculous cases to the health department, so that the number and whereabouts of the cases will be known. If a patient does not return for supervision, the physician has the further responsibility of reporting this fact to the health department, so that the department can take immediate action and bring the patient under medical care and isolation. In this respect he is an agent of the health department and is an extremely important factor in the promotion of community health.

Many questions in the epidemiology of tuberculosis remain unsolved because of the lack of efficient tuberculosis record systems in otherwise effective health departments. Better records, and time for their analysis, could reduce the number of past mistakes and enable us to determine if what we have proposed and carried out has accomplished the desired end. Carefully-devised record systems make the practice of public health, as applied to tuberculosis, a science and not just empirical guesswork. Long range planning, based on predictions derived from analysis of reliable epidemiological data, promotes economy of program operation and definitive results.

Much could be learned about the epidemiology of tuberculosis if we could encourage the participation of more general practitioners in our field studies throughout the country. The routine use of the tuberculin test on every person who visits the rural doctor's office would uncover a surprising number of hidden and unsuspected cases of tuberculosis. The examination of family contacts and a search for the original spreader leads the family physician away from his relentless daily routine into exciting by-paths of epidemiologic investigations. Through the utilization of modern methods of diagnosis and follow-up the rural physician extends the frontiers of knowledge of this puzzling disease.

The deadly quarrel between microbe and man will continue unabated unless we apply all the measures at our command to insure the protection of the whole population within a short enough span of time to prevent the disease from spreading to a new generation of contacts. Five years should be the maximum time in which to examine and follow up the majority of the adult population in the entire United States.

Such rapidity of program expansion will be costly as a short-time expenditure, but inexpensive when compared to the cost of control over a period of several decades. The savings in sickness and death, although not easily demonstrated in the coldly impersonal columns of balance sheets, are the real accomplishments of such a plan.

Poverty remains, however, as the principal obstacle still standing in the path of national efforts to banish tuberculosis from among the people of the United States. We cannot conquer this disease until the standard of living improves greatly, especially among many of the non-white groups of our population.

The effective strength of a broad program of control, based on sound epidemiological principles, will develop only in proportion to its public acceptance and support. When the people demand a total assault on tuberculosis, we are prepared to measure the problem, plan the offensive and destroy the tubercle bacillus within a measurable time.

Modern Methods of Diagnosis in Pulmonary Tuberculosis

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The mass roentgen surveys now being conducted on an increasing scale in Minnesota have disclosed and will continue to disclose many adults with abnormal lung shadows suspicious of pulmonary tuberculosis. These apparently healthy individuals are then referred to their own physicians for diagnosis and possible treatment. It was felt that a brief review of the clinical studies necessary in establishing the presence or absence of active pulmonary tuberculosis might benefit the physician to whom these cases are sent for further study.

A roentgen report of pulmonary tuberculosis, either definite or suspicious, is an indication for a complete diagnostic study in order to determine: (1) the presence or absence of pulmonary tuberculosis; (2) the activity or inactivity of the pulmonary tuberculosis, if present; (3) the general therapeutic approach, which will include a decision as to the need for immediate sanatorium care or whether further home observation with or without restriction of normal activities is warranted and (4) the diagnosis of the abnormal roentgen shadows if tuberculosis is eliminated as the cause.

A complete clinical study should include a history, physical examination, tuberculin tests, roentgenograms, sputum or gastric washing studies and other laboratory procedures. Clinical judgment will then be required to evaluate and correlate these various studies in order to determine the exact diagnosis, when that is possible. The diagnosis may be apparent after brief study but often close observation for prolonged periods will be required and the ingenuity of the physician will be taxed to the utmost. It will be necessary for the private practitioner to undertake these studies because sanatorium beds will not be available for study in the questionable cases. The available beds must be utilized for the active, infectious cases.

History

The usual symptoms of tuberculosis are too well known to require elaboration. However, since many of the patients will present recent roentgen abnormalities, special attention should be directed toward the discovery of mild symptoms, such as malaise, slight to moderate loss of appetite and weight, as well as hacking cough with or without expectoration. Pleurisy or hemoptysis in the present or past history should always be checked.

Recent or past exposure to tuberculosis should be recorded. A positive family history is considered significant, especially if there have been multiple cases or deaths from tuberculosis. The details of previous tuberculin tests and roentgenograms should be listed and verification of significant reports should be obtained, whenever possible. The occupation and possible occupational exposure may be important because tuberculosis now is a compensable disease under certain circumstances.

Physical Examination

A general physical examination with special attention directed toward the lungs is desirable in every patient. The presence of abnormal physical findings may confirm the roentgen changes already demonstrated. Abnormal physical findings should not be expected when roentgen shadows are small and their absence should not lead to undue optimism. Moderately coarse rales in the upper lung fields heard best after forced cough must be regarded with extreme suspicion. Since all of the patients have already had a chest roentgenogram, the importance of the physical examination of the lungs is reduced but should not be omitted.

Tuberculin Tests

The tuberculin test is extremely valuable in the differential diagnosis of tuberculosis, if it is applied correctly with potent material and if it is interpreted accurately. The Mantoux intradermal test is recommended for general use. The standard solutions now in common use are PPD (Purified Protein Derivative) and O.T. (Old Tuberculin).

PPD is generally used in two strengths with the first strength of 0.00002 mg. injected intradermally and read at 48 hours. If this is negative, the second strength of 0.005 mg. is used in the same manner. If both tests are negative the patient may be considered to have a negative tuberculin reaction. The test is interpreted as positive if edema or induration (excluding erythema) measuring 5 x 5 mm. or greater is present after 48 hours. The use of PPD has been limited primarily to hospitals and sanatoria because it is unstable after dilutions have been made and is discarded within 24 hours. It has the advantage of being slightly more specific than O.T. and the danger of severe local reactions is reduced.

O.T., on the other hand, is more stable than PPD and will remain potent up to two weeks after dilution, if refrigeration is used. The National Tuberculosis Association recommends that 0.01 mg. (1/10 cc. of 1:10,000 dilution) be used as the initial testing dose. It is injected intradermally, just as PPD, and read at 48 hours. If this test is completely negative, follow with 1.0 mg. (1/10 cc. of 1:100 dilution). However, if the first test revealed a questionable reaction an intermediate dose of 0.1 mg. (1/10 cc. of 1:1000 dilution) should be used in order to avoid the possibility of a severe local reaction. The Hennepin County Tuberculosis Association distributes O.T. to the physicians of Hennepin County diluted in strengths of 1:1000 and 1:500 so that 1/10 cc. contains 0.1 mg. and 0.2 mg. respectively. The Minnesota

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State Board of Health sends O.T. to the physicians of the state in whatever dilutions they desire.

Since the number of positive tuberculin reactors in this state is steadily diminishing, even in the adult population, the significance of the tuberculin test is increasing. It, therefore, behooves every physician to be acquainted with the technique of application and interpretation. Every test should be read personally and the dosage, type of tuberculin used and the reading should be recorded accurately.

SPUTUM STUDIES

The recovery of proved tubercle bacilli by examinations of sputum or gastric contents establishes the diagnosis of tuberculosis. It is important, therefore, to utilize all methods of examination before deciding that tubercle bacilli are absent. When sputum is available, the direct smear examination usually will be performed first. This method is inexact but may suffice in certain cases. It is necessary that 100,000 tubercle bacilli be present in one cubic centimeter of sputum before they can be identified by the usual direct smear technique. The accuracy of the smear examination is markedly increased when the sputum is concentrated first. Cultures or guinea pig inoculations are necessary, when tubercle bacilli cannot be recovered by the preceding types of examinations. One may only conclude that tubercle bacilli are absent after examinations have been done utilizing all available methods.

It is necessary to resort to examination of fasting gastric contents when the clinical findings indicate the need for careful search for tubercle bacilli and gross sputum cannot be obtained for study. These specimens are examined in a manner similar to that used for sputum. However, the direct smear examination is less significant because of the frequent presence of acid-fast saprophytes in the gastric contents and, therefore, cultures or guinea pig inoculations are always necessary for identification of tubercle bacilli. At the present time this procedure is not practical unless the specimen can be studied shortly after it is obtained. Apparently even a few hours delay markedly decreases the possibility of the recovery of viable tubercle bacilli. Attempts are now being made by local and state health units to set up a satisfactory technique for the collection and handling of these specimens.

Persistent efforts to recover tubercle bacilli by all available means are warranted when proper indications are present. The identification of acid-fast bacilli as tubercle bacilli should not be accepted on the basis of smear examinations alone, unless confirmed by other clinical data. When in doubt, resort to cultures or guinea pig inoculations.

ROENTGENOGRAMS

The roentgenographic report which is sent to the physician will include a description of the shadows visualized and often the roentgenologist's opinion as to the diagnosis and its significance. The physician in charge of the patient should, however, determine the final diagnosis on the basis of all the available data, including the roentgen examination. The roentgen examination is extremely important but it should be used to improve sound clinical judgment, not to replace it. The opinions of experienced roentgenologists are invaluable but their value will be enhanced by complete clinical studies. When abnormal shadows are reported, the film should be examined by the physician, not for the purpose of checking the roentgenologist but for the physician's own elucidation.

Serial roentgenograms are valuable in helping to determine the activity of suspected tuberculous lesions. If the question of activity is acute, subsequent roentgen studies, at intervals ranging from four to twelve weeks, are recommended. Even when inactive tuberculosis is definitely diagnosed, the patient should not be dismissed completely but yearly roentgen examinations should be advised.

OTHER PROCEDURES

The determination of the hemoglobin, the erythrocyte sedimentation rate and the white blood cell and differential count is worthwhile as part of the complete diagnostic study. The sedimentation rate, especially, is valuable when the differentiation of activity or inactivity is a major problem. These tests may be within normal limits with definitely active tuberculosis in the minimal or early moderately advanced stage but these cases will cause less concern than the cases with abnormal blood changes.

The installation of an opaque oil, such as lipiodol, is helpful in demonstrating bronchiectasis which may coexist with an old, inactive pulmonary tuberculosis. The bronchiectasis, often produced by the previously active broncho-pulmonary tuberculosis, may cause chronic symptoms confused with those of active pulmonary tuberculosis.

Bronchoscopic examination may be necessary to explain roentgen shadows indicative of bronchial occlusion, either partial or complete. At times, tubercle bacilli may be recovered from bronchial aspirations when ordinary examinations of sputum or gastric contents have been negative.

CASE REPORTS

The following case reports illustrate the methods used in eliminating tuberculosis as the cause of the pulmonary roentgen shadows. The correlation of the diagnostic data may make the correct diagnosis apparent but at times this may not be possible. However, a negative diagnosis of tuberculosis is in itself of distinct benefit to the patient.

Case 1. H. N., a 36-year-old female, was admitted to Glen Lake Sanatorium on August 28, 1946, with the chief complaint of slight edema of the lower extremities. The edema had been present intermittently since December 1944. The edema eventually was thought to be due to faulty diet with insufficient protein intake. On August 20, 1946, as part of a general physical examination, her physician ordered a roentgen examination of her chest which was reported by a roentgenologist as showing definite pulmonary tuberculosis. The patient was advised to enter the sanatorium immediately. She had no symptoms referable to the lungs.

On admission the history revealed no occupational,

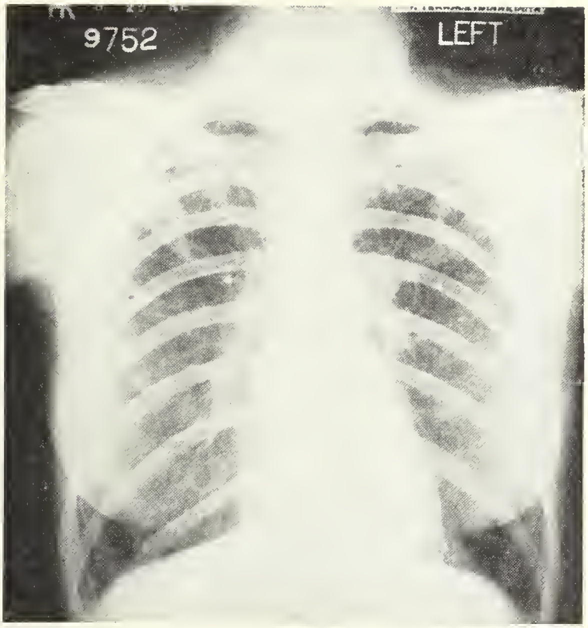

Fig. 1. Case 1. Upper lobe fibroid infiltration, etiology undetermined.

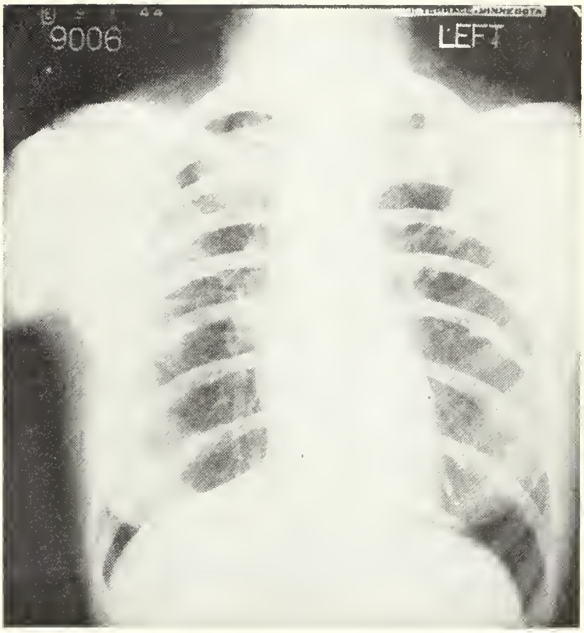

Fig. 2a. Case 2. Bilateral upper lobe infiltration, non-tuberculous. Probable diagnosis, pulmonary sarcoidosis.

personal or family exposure to tuberculosis. Her temperature and pulse rate were normal and remained so throughout her hospital stay. There were no abnormal physical findings of her lungs except for slight increase in whispered voice transmission in both apices. Roentgen examination of the lungs (Fig. 1) was interpreted by an experienced roentgenologist as showing bilateral, fibroid and exudative pulmonary tuberculosis, extending on the right side to the level of second anterior interspace and on the left side to the level of second anterior rib. Questionable cavitation in the right apex was reported. Further roentgen examinations during residence revealed no change. Repeated tuberculin tests were negative, using the usual two strengths of PPD and four strengths of O.T. ranging from 0.1 mg. to 10 mg. Sputum could not be obtained for concentration or direct smear examination but four gastric washings were negative for tubercle bacilli. Laboratory examinations, including hemoglobin, white blood and differential counts and erythrocyte sedimentation rate, revealed no abnormalities.

After consideration of the diagnostic data it was felt that the patient did not have pulmonary tuberculosis even though an exact diagnosis of the roentgen shadows could not be made. The patient was discharged on January 14, 1947, with a final diagnosis of chronic pulmonary fibrosis of undetermined etiology.

Case 2. F. B., a 32-year-old female, was admitted to the sanatorium on September 6, 1944. She had no complaints at that time. Her history dated back to February 1943 when she developed a severe chest cold which persisted for two months, although she remained away from work only one week. At that time she was supposed to have had the "flu". In May 1943 she was rejected for army nursing service because a roentgenogram disclosed what appeared to be pulmonary tuberculosis. From June 1943 to October 1943 she was not permitted to work and was observed carefully with monthly roentgenograms. During this period her tuberculin test was negative, a gastric washing failed to reveal tubercle bacilli and her sedimentation rate was normal. Her physician felt she did not have tuberculosis but admitted his inability to make an exact diagnosis. Another internist made a diagnosis of tuberculosis. In October 1943 she was permitted to return to work on a restricted basis and in January 1944 she resumed full time work. Her condition remained unchanged until June 1944 when a roentgenogram showed a bilateral increase in shadows and hospitalization was advised. From June 1944 until admission to the sanatorium in September 1944 she was hospitalized in Minneapolis where she was observed and studied by two chest specialists. One felt she had tuberculosis and the other thought she did not, although he admitted he couldn't make an exact diagnosis.

On admission her history revealed no symptoms. Her first tuberculin test was done in 1930 and was reported as negative. Tuberculin tests had been repeated yearly and had always been reported as negative. Her temperature and pulse rate were normal. Physical examination of her lungs revealed dulness in the right apex anteriorly and to the fourth dorsal spine posteriorly with some increase in spoken voice transmission in the upper lobe posteriorly. On the left side there was only some increase in whispered voice transmission posteriorly. A chest roentgenogram (Fig. 2a) revealed "bilateral, fibroid and slightly exudative lesions in both upper lung fields, which are probably tuberculous." The first tuberculin test with 0.00002 mg. PPD was negative but a repeat test with 0.005 mg. PPD was read as showing 10 x 13

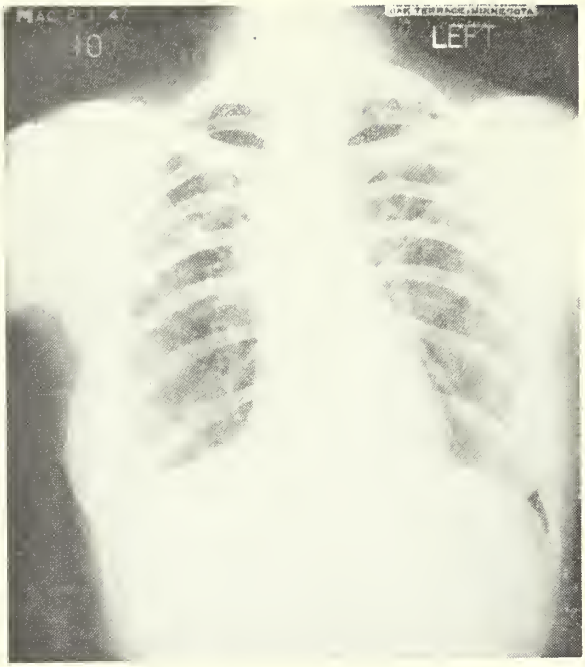

Fig. 2b. Case 2. Same case 29 months later, showing moderate resolution.

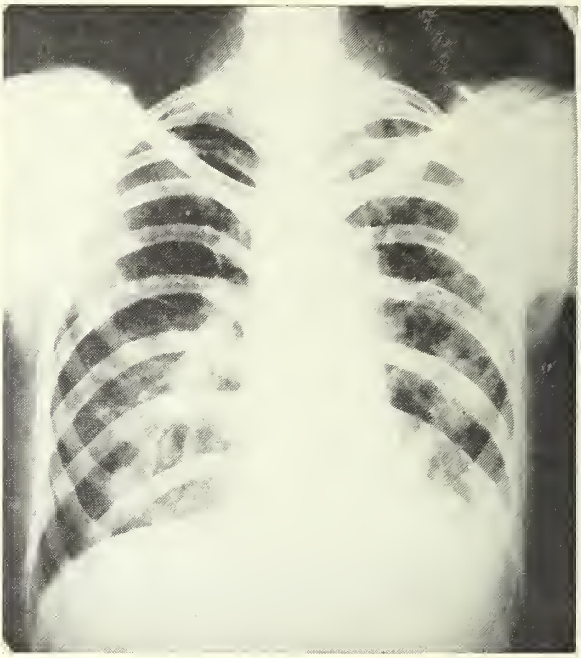

Fig. 3a. Case 3. Extensive infiltration, bilateral, resembling advanced tuberculosis. Final diagnosis, allergic pneumonitis.

mm. induration. However, two subsequent tests with the same strength of PPD were interpreted as negative. Sputum could not be obtained for smear or concentration examinations but a gastric washing culture failed to reveal tubercle bacilli. Laboratory studies demonstrated a hemoglobin of 14.3 gm., a white blood cell count of 4,275 with 73 per cent polymorphonuclears, 17 per cent lymphocytes, 7 per cent monocytes and 3 per cent eosinophiles and the sedimentation rate 8 mm. in 1 hour by the Westergren method.

After consideration of the available data it was felt that tuberculosis was not the cause of her roentgen shadows and she was discharged on November 29, 1944. The diagnosis was thought to be pulmonary sarcoidosis. There were no skin lesions, no glandular enlargements and roentgen examination of the hands and feet revealed no abnormalities. She was advised to return to work without restriction and be followed periodically by roentgen examinations. She has followed this advice and her last roentgen examination (Fig. 2b) on February 1, 1947, showed continued slow regression of her roentgen shadows.

Case 3. O. R., a 28-year-old female, was admitted to the Sanatorium on July 29, 1938. She had first noted a persistent dry cough in December 1937. At this time she was pregnant and on March 1, 1938, delivered a normal infant. At the time of her routine postpartum examination, she again complained of her cough. Her physician diagnosed bronchitis and treated her accordingly. No improvement resulted and in May 1938 a single tuberculin test was applied and found negative. In June 1938 the cough became more troublesome and expectoration, anorexia, loss of weight and malaise developed. A chest roentgenogram was reported as showing pulmonary tuberculosis. A second tuberculin test was applied and read as positive. One sputum examination failed to reveal tubercle bacilli.

On admission the above history was confirmed. There was no known exposure to tuberculosis. Her husband and four children were undergoing examinations for tuberculosis at a clinic. Additional history revealed frequent attacks of coughing and wheezing prior to the onset of the present illness. These attacks occurred as often as twice a week. Her temperature ranged to 102 degrees and her pulse rate reached a maximum of 110 per minute. Physical examination of the right lung demonstrated impairment of resonance in the upper half with broncho-vesicular breath sounds and a slight increase of whispered voice transmission in the same area. There were no rales. On the left side there was impairment of resonance throughout with broncho-vesicular breath sounds and a slight increase of whispered voice transmission. Spoken voice transmission was normal and moderately coarse rales were heard after cough between the fourth and eighth dorsal spines posteriorly. Roentgen examination of the lungs (Fig. 3a) was interpreted as showing far advanced pulmonary tuberculosis scattered through the entirety of the left lung and the middle third of the right lung with bilateral cavitation. Tuberculin tests with PPD and M.A. 100 were negative in all strengths. Fifteen smear examinations and guinea pig inoculations of sputum, stool and gastric washings failed to reveal tubercle bacilli. Laboratory studies revealed hemoglobin of 78 per cent, a white blood cell count of 12,400 with 54 per cent of polymorphonuclears, 28 per cent lymphocytes, 0.5 per cent

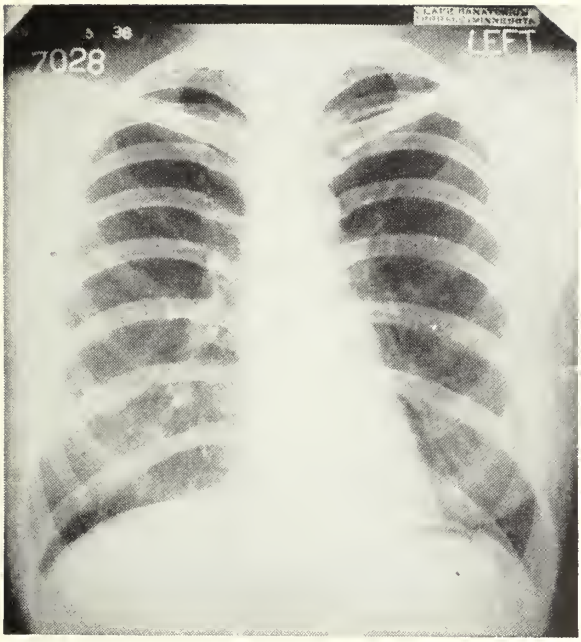

Fig. 3b. Case 3. Same case three months later. Almost complete bilateral resolution.

monocytes and 17.5 per cent eosinophiles.

Since the tuberculin tests were negative and tubercle bacilli could not be recovered, her condition was considered nontuberculous in spite of the definite roentgen report. Subsequent white blood cell examinations always revealed the eosinophiles were increased above normal, ranging from 7.5 per cent to 16 per cent. Subsequent roentgen examinations showed progressive improvement and the last examination (Fig. 3b) disclosed that the extensive infiltrations had almost completely resolved. She was discharged on November 5, 1938, with a final diagnosis of allergic pneumonitis or what would now be called subacute Loeffler's syndrome.

Comment

No patient should be dismissed with the statement that the roentgen shadows are of no significance unless a careful evaluation of the available diagnostic data has been made. Roentgen lesions, even if apparently insignificant, should be rechecked at least once a year. More significant shadows should be re-examined at four to twelve week intervals, as long as there is any doubt regarding activity. The diagnosis of tuberculosis, active or inactive, is a distinct probability when roentgen lesions suggestive of tuberculosis and a positive tuberculin test are present. The recovery of proved tubercle bacilli usually indicates the process is an active one and requires early sanatorium treatment. The differentiation between inactive and active pulmonary tuberculosis may be difficult and may require close and careful observation. In these cases serial roentgenograms are valuable.

Tuberculosis can usually be eliminated as a probable diagnosis when the tuberculin reaction is negative and a thorough search by all methods of examination has failed to reveal tubercle bacilli. It is important to remember that any acute, subacute or chronic pulmonary or bronchial disease may simulate tuberculosis and the reverse is also true. The main purpose of roentgen surveys is to uncover the active cases of tuberculosis which require sanatorium therapy without subjecting the inactive cases to unnecessary treatment.

Conclusions

1. Mass roentgen surveys have uncovered and will continue to uncover many adults with abnormal lung shadows. The exact etiological diagnosis of these shadows may be extremely difficult.
2. The private practitioner should utilize all available diagnostic data before reaching final conclusions.
3. Tuberculin tests, roentgenograms and the search for tubercle bacilli in the sputum or gastric contents are the essential examinations for the diagnosis of pulmonary tuberculosis.
4. Adequate histories, physical examinations and blood studies are valuable accessory procedures.
5. The installation of opaque oil and bronchoscopy are important diagnostic aids but are necessary only occasionally.
6. No single diagnostic test can be relied upon to diagnose all cases correctly but diagnostic errors will be reduced to a minimum if all available methods are used.
7. The success of the mass survey program will depend upon the diagnostic acumen and clinical judgment of the private physician.

TUBERCULIN UNITS USED IN DENMARK

As the strengths of different batches of tuberculin vary considerably, it is necessary to give the dose of a tuberculin in comparison to the standard. For this reason it is not practical to give the dose of a tuberculin by weight.

In Denmark, since 1939, we have given the doses in tuberculin units (T. U.):

1 T. U. = 1/50,000 mg. of the Standard Purified Tuberculin (PT VII).
1 T. U. = 1/100 mg. of the International Standard Old Tuberculin.

A great advantage of expressing the doses of tuberculin by units and not by weight is that units are easier for personnel to remember in practical testing. In Denmark we use two doses of tuberculin for the Mantoux test, the first doses being 1 or 3 T. U., the final dose always being 100 T. U.

The expression of doses in T. U.'s is only possible on the basis of a careful standardization of the tuberculin employed.—From *Standardization of Tuberculin,* by J. Holm and P. Lind, in *Public Health Reports,* February 7, 1947.

Guide for Disposition of Persons with Abnormal Pulmonary Findings on X-Ray Films*

Herman E. Hilleboe, M.D.,† and Johannes Holm, M.D.‡
Washington, D. C.

MILLIONS of people in the United States have been examined by means of mass radiography since the early days of World War II. This new technique is rapidly achieving the long-sought goal of obtaining X-ray examinations of the lungs of the majority of the adults in our country. This objective can easily be reached within 5 years if all our resources are mobilized and a national plan is executed with speed and efficiency.

Yet a word of caution must be given to prevent indiscriminate diagnoses of pulmonary tuberculosis on the basis of X-ray examination alone. The screening films of thousands of persons have shown lesions characteristic of early tuberculosis. Many of these persons have had no tuberculin tests performed, no sputum examination, and no history of symptoms taken to confirm or deny the suspicious film findings. Yet most of them have been labeled as tuberculous. This is scientifically unsound, and because such a practice tends to become commonplace, and because damage is done to people and to control programs, we should now take stock of our diagnostic criteria for the clinical determination of early tuberculosis.

Specialists in tuberculosis rightly insist that, before final diagnosis, every attempt be made to obtain sputum specimens, and that such specimens be submitted to meticulous examination; that is, by direct smear of actual sputum and, if this is negative, by culture or guinea pig inoculation. If sputum is not present, a stomach washing should be made and the contents examined by appropriate culture methods in laboratories that employ skilled bacteriologists. In cases of pleural effusion, the same procedure should be followed. This is possible only in an accredited laboratory which has been certified by some impartial central laboratory.

If, after such diligent search, no tubercle bacilli are found, the diagnosis should be limited to "suspected tuberculosis." This does not mean that many of the shadows found on the survey films are not the residue of a tuberculosis process that once was active. Nor does it mean that the person should not be followed for several years to watch for new evidences of disease activity. If changes occur on the X-ray film, frequent and careful observation is essential, and intensified search should be made for tubercle bacilli. Certainly such cases should be suspect until all doubt is resolved. Nevertheless, in order to be scientific in our practice of medicine and to avoid needless personal distress, we should refer to such persons as "suspects" until such time as tubercle bacilli can be demonstrated, and the diagnosis of tuberculosis proved. A firm stand of this sort should do much to clarify confused thinking in some mass radiography programs. To put it simply and candidly: Do not diagnose pulmonary tubercuolsis on the basis of an original X-ray film alone.

One must study "suspected" cases by means of a careful history, including recent or present symptoms which are often caused by tuberculosis. For differential diagnosis it is essential to employ the tuberculin test, using the intracutaneous method properly applied and interpreted by an experienced person. In the presence of a negative tuberculin test, other reasons than tuberculosis must be found for suspected shadows, even though their location or configuration strongly suggest disease. Indeed, even when a cavity is demonstrated on the film, a negative tuberculin test demands that some etiological factor other than tuberculosis be sought as the cause.

No person should be labeled with the diagnosis of pulmonary tuberculosis on the basis of incomplete evidence. "Suspected tuberculosis" on the X-ray film must be corroborated by a positive tuberculin test and by positive bacillary findings, before the unsuspecting person is told he has real pulmonary tuberculosis. Let treatment be delayed and judiciously deliberated until all the facts are in and all the evidence is evaluated. If such a practice is universally followed, physicians will gain considerably in accuracy and skill of diagnosis, and limited hospital resources will be conserved. Most important of all, the person suspected of having tuberculosis will be assured thorough study and scientific diagnosis, and will be treated for tubercuolsis only if the disease is actually present. Medical judgments based on positive and complete evidence will give a final verdict that protects the individual and the public health.§

This Guide is presented for use, on a provisional basis, in case-finding and follow-up programs in tuberculosis control of the Tuberculosis Control Division. After a few years' experience we will be prepared to offer specific recommendations to the medical profession. It is based upon recent extensive experience in the United States and Denmark and presents both clinical and public health aspects of the subject.

Before case-finding programs are started, clinic and

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This disposition guide is presented as a tentative plan. It should be used as such for two years and then revised according to what our experience will teach us. We have an unusual opportunity locally with the mass chest X-ray survey to test the validity of the author's proposed guide.

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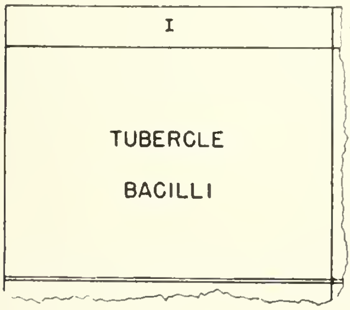
§This introductory passage includes excerpts from the editorial "What is Early Tuberculosis?" *Public Health Reports*, vol. 61, No. 36 (September 1946).

laboratory facilities must be provided in order to obtain information necessary for the diagnosis and disposition of cases. Carefully controlled studies have shown that the ordinary laboratory is not prepared to do diagnostic culture work with tubercle bacilli. Great care must be taken in the choice of a laboratory to be used for such work and in evaluating the results from different laboratories. This Guide requires the services of a laboratory of the highest quality.

The examinations recommended in the Guide need to be carried out only on persons with abnormal pulmonary findings on X-ray films; that is, those who have definite or suspicious parenchymal infiltrations demonstrated on the screening film and confirmed on the 14" x 17" celluloid film.

Instructions

Accurate findings from four distinct examinations must be obtained and evaluated before accurate diagnosis and proper disposition can be made.



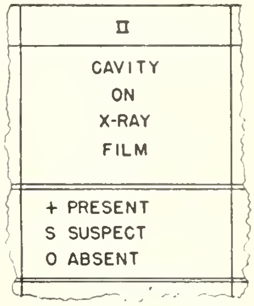
I. EXAMINATION FOR TUBERCLE BACILLI

A thorough examination for tubercle bacilli is so important that it commands first place in this guide. If the person is expectorating, the sputum should be examined by direct smear first. If the sputum is negative by direct smear, a culture should be made from the same specimen at once. For the person who really expectorates material from the lungs, no gastric lavage is necessary. For those persons who do not expectorate, a gastric lavage is required. This must be performed by an experienced person and the contents examined by culturing in a laboratory qualified to do this special culture work.

The terms in *Group I, Tubercle Bacilli,* are used as follows:

NO SPUTUM	means no expectoration.
SPUTUM SMEAR	Prepare slides from sputum. Stain slides by Ziehl-Neelsen stain.
NEGATIVE	means no tubercle bacilli demonstrated.
POSITIVE	means the demonstration of several acid-fast bacilli.
SPUTUM CULTURE	Use a culture medium of recognized efficiency.
NEGATIVE	means no colonies of tubercle bacilli demonstrated. If no growth appears, the culture must not be labeled as negative until it is observed a minimum of 6 weeks after inoculation.
POSITIVE	means the demonstrations of typical colonies of tubercle bacilli. These colonies will usually appear 2 to 4 weeks after inoculation. Microscopy of smears from the colony must show typical tubercle bacilli.
GASTRIC CULTURE	The stomach of the fasting person must be thoroughly washed out with 200 to 300 cc. of sterile water in order to obtain a genuine sample. The culture is then made from the material in the same manner as described for sputum.
NEGATIVE	means no colonies of tubercle bacilli are demonstrated by culture.
POSITIVE	means that typical colonies of tubercle bacilli are demonstrated by culture from the stomach washings.

II. IDENTIFICATION OF CAVITY ON X-RAY FILM



Determination of cavity must be made on a 14" x 17" film and not on the basis of a screening film of any type.

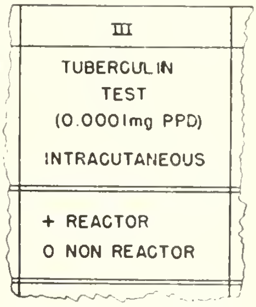
The inclusion of three classifications for identification of cavity, + *Present,* s *Suspect, and* 0 *Absent* — instead of just positive and negative as formerly — is based on experience which has shown that error in identification of cavities is significantly reduced if the group *Suspect* is included. If a cavity is immediately recognized on a film, the findings are called + *Present;* if no cavity is seen, it is called 0 *Absent.*

If there is a question of the presence or absence of a cavity, the film is classified as *Suspect.* Further X-ray study with special views is then indicated.

The terms in *Group II, Cavity on X-ray Film,* are used as follows:

+ PRESENT	means the presence of a cavity in one or both lungs.
s SUSPECT	means any shadow suspect for cavity that cannot be classified.
0 ABSENT	means no definite or suspected evidence of a cavity in one or both lungs.

II. TUBERCULIN TEST



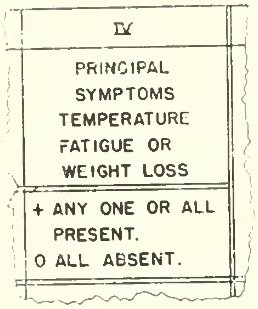
The single intracutaneous test may be used with a dosage of 0.0001 mg. of standardized PPD, or equivalent dosage of Old Tuberculin performed and read by a person experienced in this work.

The terms in *Group III, Tuberculin* Test, are used as follows:

+ REACTOR	means that reaction shows an induration (edema) with a diameter of at least 5 mm., 72 hours after injection.
0 NON-REACTOR	means no induration, or an area of induration less than 5 mm. Persons who show redness alone must be labeled Non-Reactors. Occasionally there may be doubt as to the interpretation of the reaction. If this is the case, the second test (using 0.002 mg. standardized PPD) may be employed. This should be called a "Reaction" only if there is typical induration of 10 mm. or more.

IV. PRINCIPAL SYMPTOMS

Tuberculous persons may exhibit a variable number of pulmonary and nonpulmonary symptoms and physical findings. However, clinical experience has shown that many symptoms that occur singly or in groups are of little help in determining the disposition of cases. These include such symptoms as pains in the chest, blood in the sputum, history of tuberculosis in the family, physical examination of the chest, and laboratory findings of in-


IV
PRINCIPAL SYMPTOMS TEMPERATURE FATIGUE OR WEIGHT LOSS
+ ANY ONE OR ALL PRESENT.
0 ALL ABSENT.

creased sedimentation rate and blood changes.

The study of hundreds of cases of clinical tuberculosis indicates that the principal symptoms that must be considered are: (a) temperature elevation, (b) fatigue, and (c) loss of weight — within the last half year and not otherwise explainable.

Sputum, the principal symptom, is fully considered under *Group I.*

The terms in *Group IV, Principal Symptoms,* are used as follows:

TEMPERATURE	means at least a one-degree rise above normal afternoon temperature for a period of 1 week, or a history of elevated temperature within the last 6 months—as determined by a physician or nurse.
FATIGUE	means weariness without apparent cause. If present, this should be considered a positive symptom.
WEIGHT LOSS	The amount of weight lost will depend upon the usual weight of the person. The significance of the amount of weight lost will be left to the discretion of the clinician.
+ ANY ONE OR ALL PRESENT	If any one or all of these three symptoms occur, + **Present** will be applicable.
0 ALL ABSENT	If there is no rise in temperature, no fatigue, no weight loss, **0 Absent** will be applicable.

Routine Procedure for Disposition of Cases

When there are abnormal pulmonary findings on the small screening film, a 14" x 17" celluloid film must be taken. There are two reasons for this. First, there may have been error in identification of the original small film. Second, the additional examination helps in the definitive identification of the lesion detected on the screening film. It will also aid in determining whether a cavity is *Present* or *Absent.*

Procedure of the first visit

A. Take a careful history with special attention to the principal symptoms, and make a permanent record of the findings.

B. Perform a tuberculin test as outlined and instruct the person to return in 72 hours for reading of the test.

C. Ask the person if he is expectorating. If so, give him a container and instruct him how to collect sputum. On the morning of his next visit he is to cough up the material produced on first arising. Instruct the patient to bring the container to the clinic, when he comes to have the tuberculin test read. If the person is not expectorating, plan for gastric lavage at the time of reading the tuberculin test. Explain the importance of the gastric lavage. For the gastric lavage, no food should be taken after 8 P.M. of the previous evening and no food or fluids on the morning before the clinic visit.

Second visit (*72 hours after first visit*)

A. Read and record the results of the tuberculin test, according to the procedure outlined.

B. If there is sputum, send specimen to the laboratory at once for examination, as outlined. The patient is then requested to return in 6 weeks unless sputum results require that he be notified sooner. If, at any time during the interval between visits, he develops symptoms, he should come immediately to the clinic.

C. If no sputum is obtained and the patient is a nonreactor to the tuberculin test, no gastric lavage is necessary. The present examination is complete. The patient is requested to return to the clinic in 6 weeks for another tuberculin test. If sensitivity to tuberculin has not developed by the time of the third examination, the case can be referred to general medical supervision as nontuberculous. Some other cause must be found for the shadows on the X-ray film.

D. If there is no sputum and the patient is a reactor to the tuberculin test, a gastric lavage should be done the next day and the gastric washings sent to the laboratory for culture. (Direct smear is not of value in the examination of gastric contents.) The patient is given an appointment after gastric lavage is performed and is requested to return in 6 weeks unless otherwise notified, or unless he develops symptoms.

Third visit

A. If the direct smear of the sputum is positive, the person should be notified at once to return for his third visit. Disposition to a sanatorium for immediate care is indicated. Great care must be exercised not to frighten the person unduly and to explain the diagnosis and need for treatment.

B. If, in 2 to 4 weeks, culture of the sputum or gastric lavage is reported positive, notify the patient to come in at that time for disposition. If, however, a positive report is received only after 4 to 6 weeks, the person can come in at the time already scheduled for his next visit.

C. If the culture of sputum or gastric lavage is negative, disposition of the patient can be made at his next regular appointment.

Follow-up and Disposition of Cases in Nine Groups

The Guide shows nine principal groups into which the results of a person's examinations may fall. There are corresponding recommendations for disposition of cases in each group. Procedures for public-health nurses and medical social workers in the follow-up program are being prepared for distribution.

Examples: *Group 0* indicates that the person has either no sputum or the sputum smear was negative; that no cavity is present on the X-ray film; that he is a nonreactor to the tuberculin test; and that he presents no temperature elevation, fatigue, or weight loss. This results in a recommendation to refer the case for general medical supervision because of lack of evidence of tuberculosis.

Group 9 indicates that the person has a positive sputum (gastric culture is not necessary); that X-ray findings are either "cavity present," "cavity suspect," or "cavity absent"; that he is a reactor to tuberculin; and that he may or may not have temperature elevation, fatigue, or weight loss. The recommended disposition is sanatorium care.

Explanation of groups

Groups 7, 8, 9. Findings for each of these groups make it imperative that immediate sanatorium care be recommended. If no sanatorium beds are available, a bed in a general hospital should be found and the patient placed under the care and treatment of a chest specialist.

If no hospital bed can be found, it will be necessary to treat the patient temporarily at home. In the event that home care is necessary (but it should be avoided if at all possible), there is urgent need for expert and continuous medical care by a physician trained in chest diseases.

Special attention must be given to members of the household to protect them from contact with the patient or his infectious discharges. In addition, it is especially important for a public-health nurse to instruct the patient and family in contagious-disease technique and for such a nurse to visit at regular intervals to see that the instructions are followed and that contacts are examined regularly. If special social, economic, or emotional problems are discovered, refer the situation to a medical social worker, if one is available; if not, the public-health nurse can call in the proper social agency in the community.

Groups 5 and 6. Both groups represent persons who have a positive gastric culture, whose X-ray findings are "cavity suspect" or "absent," who are reactors to tuberculin and who do not have any principal symptoms.

Group 5. Even with a positive gastric culture and the other indicated findings, the recommendation will be *Special Study or Follow-up for Tuberculosis,* providing the patient has satisfactory home conditions and no children are exposed.

As clinical observations are continued, changes in findings may occur which will place the patient either in *group 7, 8,* or *9,* whereupon sanatorium care will be recommended, or in *group 3* or *4,* whereupon follow-up alone is sufficient.

Group 6. The recommendation for persons with these findings who have inadequate living conditions or are exposing children to infection will be sanatorium care.

Group 4. If there is a negative sputum or negative gastric lavage but a cavity is present, such an individual can best be studied in a tuberculosis clinic until final diagnosis is made. Such cases, in spite of reacting to the tuberculin test, can be classed only as *Suspect* with positive tuberculin tests, since tubercle bacilli cannot be demonstrated.

Group 3. This particularly is the type of case that must be followed in a clinic because it might be an early case of tuberculosis requiring further study before final disposition. In order to make final disposition, there must be interval examination to determine the significance of any findings. A person who is in *group 3* should be notfied to return in 3 months for interval examination or whenever he might become ill. At this next 3-month's visit, certain examinations must be repeated:

(a) Repeat the search for tubercle bacilli in the usual manner. Repeat the X-ray examination in order to determine whether there are changes in X-ray findings. If there are tubercle bacilli or a cavity is present, the case can be reclassified.

(b) If tubercle bacilli and cavity are absent the patient can be told to return in 6 months.

(c) At the next clinic visit in 6 months, repeat the same procedure (see (a)) and, if tubercle bacilli and cavity are still absent, 1 year may elapse before another reexamination.

(d) When the patient returns 1 year after the last examination (c), repeat the procedure described in (c). If tubercle bacilli and cavity are still absent, the case need no longer be followed.

Groups 1 and 2. Such cases require special study by an expert in chest disease and are rarely tuberculous. Have patient return in 6 weeks for another tuberculin test. If the second test is also negative, the case should be studied further for differential diagnosis of non-tuberculous chest disease.

Group 0. This includes persons with abnormal pulmonary X-ray findings only. Tubercuolsis can be ruled out because principal symptoms are absent, no tubercle bacilli have been demonstrated, tuberculin testing shows no reaction, and X-ray findings reveal no cavity. To determine the origin of the abnormal X-ray shadows, refer these patients to the clinic or private physician for general medical supervision, for differential diagnosis, and for follow-up.

Follow-up Procedures for Persons in Whom Tubercle Bacilli Have Been Demonstrated in the Gastric Lavage

Persons in whom tubercle bacilli have been demonstrated in the gastric lavage should be followed with at least one thorough examination for tubercle bacilli each year (even if the lesions show retrogression and there are no symptoms), until three negative gastric-lavage cultures have been taken a year apart. If at any time during these annual examinations the gastric lavage culture becomes positive, the program of 3-month, 6-month, and 1-year examinations must again be initiated with proper disposition at each visit.

Contacts

Examine all household, occupational, and other intimate contacts of persons whose findings fall into *groups 5, 6, 7, 8,* and *9.* Consider disposition of contacts as follows:

Take a chest X-ray film and give a tuberculin test (0.0001 mg. PPD) to all contacts at first visit.

A. Contacts with abnormal pulmonary findings

Follow procedure outlined above.

B. Contacts who show NO abnormal X-ray findings and who are NON-REACTORS to tuberculin

These contacts to positive sputum cases must return for subsequent tuberculin testing until a minimum of 1 year after the last exposure to an infectious case. Such follow-up testing should be done every 3 months during exposure and two times thereafter at intervals of 6 months after contact is broken. If the nonreactor becomes a reactor, follow closely by X-ray examination every 6 months for a minimum of 2 years and do everything possible to reduce or cut off exposure. These are

GUIDE FOR DISPOSITION OF PERSONS WITH ABNORMAL PULMONARY FINDINGS ON X-RAY FILMS.

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	I	II	III	IV	DISPOSITION OF CASE		
GROUP	TUBERCLE BACILLI	CAVITY ON X-RAY FILM	TUBERCULIN TEST (0.0001mg PPD) INTRACUTANEOUS	PRINCIPAL SYMPTOMS TEMPERATURE FATIGUE OR WEIGHT LOSS	SANATORIUM CARE	CLINIC OR PRIVATE PHYSICIAN	
		+ PRESENT S SUSPECT O ABSENT	+ REACTOR O NON-REACTOR	+ ANY ONE OR ALL PRESENT. O ALL ABSENT.		SPECIAL STUDY OR FOLLOW-UP FOR TUBERCULOSIS	GENERAL MEDICAL SUPERVISION
0	NO SPUTUM OR SPUTUM SMEAR NEGATIVE	0	0	0	NOTE. MAY OMIT SPUTUM OR GASTRIC CULTURE ONLY IF II, III, IV ALL ARE 0		✓
1	SPUTUM CULTURE NEGATIVE OR NO SPUTUM, BUT GASTRIC CULTURE NEGATIVE	0	0	+		✓	
2		+	0	+ OR 0		✓	
3		S OR 0	+	+ OR 0		✓	
4		+	+	+ OR 0		✓	
5	NO SPUTUM BUT GASTRIC CULTURE POSITIVE	S OR 0	+	0		✓	
6		S OR 0	+	0	✓	NOTE SAME AS GROUP 5, BUT IF LIVING CONDITIONS POOR OR CHILDREN EXPOSED, SEND TO SANATORIUM	
7		S OR 0	+	+	✓		
8		+	+	+ OR 0	✓		
9	POSITIVE SPUTUM (SMEAR OR CULTURE)	+, S, OR 0	+	+ OR 0	✓		

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the contacts most likely to develop genuine tuberculosis.

C. *Contacts who show NO abnormal X-ray findings but who are REACTORS to tuberculin*

These contacts to positive sputum cases must have an X-ray examination after 6 months; then, if negative, one examination each year until a minimum of 1 year has elapsed since the last exposure to an infectious case. More frequent examinations may be indicated if exposure is intense and living conditions poor.

It is unwise to send any person to a sanatorium who is merely suspected of having pulmonary tuberculosis. Sanatorium care should be recommended only after demonstration of a positive direct smear or a positive culture of the sputum or gastric lavage. Even if the patient has symptoms, or a recently elevated temperature, he can be observed in the tuberculosis clinic or in a local hospital. Not until tubercle bacilli are demonstrated should a patient be sent to the sanatorium for treatment. The patient is thus spared the psychological trauma and the personal risk of being hospitalized for a disease he does not have. Furthermore, a considerable number of scarce sanatorium beds will be reserved for infectious cases that are amenable to remedial care.

It is hoped that this Guide will help tuberculosis workers improve their diagnosis and disposition of cases, and at the same time provide the most effective utilization of the energies of private physicians, limited tuberculosis clinic services, and insufficient sanatorium beds.

FOOD COSTS AND TUBERCULOSIS

Dr. Edgar Mayer, of the National Jewish Hospital at Denver, warns that the high cost of food may help cause a rise in the incidence and death rate from tuberculosis in America. He reported on the use of Army-developed high protein preparations, and advocated their use among malnourished Americans to prevent this rise in tuberculous infection.—*The Interne,*

The Importance of the Isolation and Identification of Tubercle Bacilli*

William H. Feldman, D.V.M., M.Sc., D.Sc.,
and Alfred G. Karlson, D.V.M., Ph.D.
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The one unequivocal factor in the diagnosis of tuberculosis is the demonstration of the causative organism. Other procedures, while of significance, supply evidence that in the final analysis is only presumptive. Although tuberculosis in certain stages produces clinical signs so characteristic that the correct diagnosis is obvious, the picture is not complete without the demonstration of tubercle bacilli.

As the methods of screening tuberculous patients from the general population become more refined and patients with the earliest minimal lesions are detected, procedures for demonstrating the infective agent become more important. When the incidence of the disease recedes, laboratory means for its definite diagnosis will of necessity have to be resorted to with greater frequency. In addition, decisions of far-reaching importance concerning the safety to the community of the medically rehabilitated patients must be based on whether or not the patients continue to shed tubercle bacilli although the clinical signs suggest that the disease is arrested.

The medicolegal aspect of the problem must also be considered. Evidence of the true character of a tuberculous infection is more convincing in a court of law if the diagnosis is based squarely on the fact that tubercle bacilli were demonstrated and definitely identified. Many diseases and conditions of obscure cause masquerade clinically as tuberculosis and their nontuberculous character is best established by methods designed to reveal tubercle bacilli if they are present. To reiterate, there is no more important procedure in the clinical laboratory than tests designed to reveal the presence of tubercle bacilli. Of equal importance is the evidence indicating with acceptable reliability that a given specimen contains no tubercle bacilli.

General Suggestions for Collecting Specimens

1. Containers for suspected materials should be made of sturdy glass and provided with a tightly fitting screw lid to preclude leakage.

2. To preclude errors in identification, the respective specimens must be legibly labeled, preferably with the patient's name, the number of the specimen and date on which it was obtained.

3. Preservatives should not be added to specimens consisting of sputum, urine, gastric washings or exudates. Large specimens of tissue may be preserved satisfactorily for several days by covering them with generous amounts of dry household borax. This substance deters surface putrefaction but has a very low penetration potential. It may be removed from the tissue by immersion in boiling water for five to ten seconds. Swabs containing suspected material and small bits of tissue are best handled by adding to the container a small amount of sterile physiologic solution of sodium chloride. This prevents dehydration. A small portion of every tissue specimen to be examined for the presence of tubercle bacilli should be preserved in a 10 per cent solution of formalin for subsequent histologic examination.

4. Until examined, all specimens must be kept in the refrigerator.

Material suspected of containing tubercle bacilli consists usually of sputum, urine, gastric washings, fluid from the pleural cavity or the spinal canal and exudates from lesions that have become exteriorized. The important points in collecting specimens representing the material just mentioned may be stated briefly.

Sputum. Sputum for examination should represent a twenty-four hour collection unless the clinical evidence indicative of tuberculosis is overwhelming, in which case a single specimen may suffice.

Gastric washings. Specimens obtained by gastric lavage provide the best material for demonstrating tubercle bacilli in the majority of cases of minimal tuberculosis of the lungs. This is true also in cases of pulmonary tuberculosis in which the disease is moderately advanced or even far advanced and in which sputum is scant or absent.

The material obtained should be used for the making of cultures, or preferably for the inoculation of guinea pigs. Time and effort should not be expended in subjecting gastric washings to examination by direct smear. The possible occurrence of acid-fast saprophytes in material obtained from gastric lavage should be kept in mind when reporting so-called positive cultures of such material.[1,2] This difficulty is of course precluded when the animal inoculation test is used.

Gastric lavage specimens should be digested and concentrated promptly after being withdrawn. As was suggested by Steenken, Yaeger, and Heise [3] and demonstrated by Sprick and Towey [4] and Schwarting,[5] certain enzymes in gastric secretions may have a deleterious effect on the growth and virulence of tubercle bacilli. The storage of gastric specimens intended for subsequent tests for tubercle bacilli is therefore contrary to good laboratory practice.

Urine. Specimens of urine should represent urine excreted during a twelve hour period; occasionally a twenty-four hour specimen may be desirable. Two 100 cc. portions should be removed from the pooled specimens and

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*The procedures mentioned are those used at the present time by the authors at the Institute of Experimental Medicine in the conduct of investigational studies.

centrifuged for one hour. The sediment is resuspended in 5 to 10 cc. of sterile physiologic solution of sodium chloride or water and pooled. The specimen is then ready for guinea pig inoculation or treatment with oxalic acid for cultures.

Spinal fluid, pleural fluid and washings from swabs. The spinal fluid should be submitted for examination as soon as possible and before a pellicle has formed. Spinal fluid, pleural fluid and washings from swabs are usually suitable for guinea pig inoculation without prior treatment.

Infected tissues. Sterile instruments must be used in removing and handling tissues for subsequent examination for tubercle bacilli. This applies equally to materials obtained by surgical procedures and at necropsy.

DEMONSTRATION OF TUBERCLE BACILLI IN INFECTED MATERIAL

For detecting tubercle bacilli in clinical material, the laboratorian has recourse to many procedures. Listed in order of their reliability the procedures are: (1) the animal-inoculation test, (2) cultural methods and (3) direct staining by the Ziehl-Neelsen method. We have had no experience with fluorescence microscopy and are not prepared to evaluate the method. Reports of its superiority over the Ziehl-Neelsen staining technic [6-9] are tempered by observations recording less enthusiasm.[10–12] No single procedure will be found satisfactory to the exclusion of all others. In a modern clinical laboratory designed to provide the maximal assistance to the clinician the personnel should be prepared to do any test or a combination of all tests if tuberculosis is to be excluded in conditions of obscure causation.

Cultural procedures for the detection of tubercle bacilli have reached a high degree of efficiency. When properly done, cultural methods are greatly superior to either the direct smear or the fluorescent method. However, more positive results will be obtained by the inoculation of guinea pigs than by cultural methods. Because of circumstances inherent in the materials submitted for examination, neither animal inoculation nor cultural attempts will yield as many positive results as are possible if suspected materials are used to inoculate both culture mediums and guinea pigs. Finally, it should be remembered that although one may properly question the identification of tubercle bacilli based on acid-fastness, cultural characteristics and other physical attributes, the results of animal-inoculation tests are usually unequivocal.

USEFUL SUGGESTIONS PERTAINING TO THE DEMONSTRATION OF TUBERCLE BACILLI BY THE VARIOUS LABORATORY PROCEDURES

Concentration for microscopic examination. Materials containing an excessive amount of mucus in which tubercle bacilli are few may be treated with an ordinary household bleach containing 5.25 per cent sodium hypochlorite.[13] These commercial bleaches are cheap and readily obtainable. Their use is amazingly simple and rapid. Nonacid-fast bacteria, pus, blood and mucus are completely digested and, as a consequence, the sediment consists almost entirely of tubercle bacilli if any are present. Concentration is accomplished as follows: 5 to 10 cc. of sputum or 25 to 50 cc. of urine are placed in a wide-mouthed bottle or flask to which is added an equal volume of 5.25 per cent commercial sodium hypochlorite solution. The mixture is shaken two or three times over a two minute period and left at room temperature for an additional ten minutes. The mixture is then transferred to a 15 cc. conical tube and centrifuged for ten minutes. The supernatant fluid is discarded and the tube drained for two minutes. The sediment is then stained by the Ziehl-Neelsen technic or it may be examined by fluorescent microscopy. Sodium hypochlorite has a high sterilizing potential against tubercle bacilli; consequently, sediment obtained after treatment with this reagent is not suitable for subsequent cultural procedures or for animal inoculation.

Preliminary treatment of material intended for making cultures or for the inoculation of guinea pigs. Since most clinical material submitted for the demonstration of tubercle bacilli by cultural methods or by the inoculation of guinea pigs contains other micro-organisms, it is necessary to utilize a suitable reagent for their elimination. Many different acids and alkalis have been suggested for this purpose. A 5 per cent solution of oxalic acid [14] or a 3 per cent solution of sodium hydroxide [15] has in our experience been most satisfactory. If it is necessary to eliminate pathogenic micro-organisms other than tubercle bacilli from material intended for animal inoculation, sodium hydroxide or oxalic acid may be used provided the inoculum is neutralized.

Methods of culture. There probably have been more different culture mediums proposed to promote the growth of tubercle bacilli than of any other specific bacterium. The number of different mediums is legion but, as a matter of fact, practically all contain one or both of the two foodstuffs favorable for the growth of tubercle bacilli. These are egg and potato. We have tried many mediums proposed by other authors and have been guilty of suggesting some of our own. At present our favorite medium is a combination of egg yolk and agar.*
from a medium described in 1896 by Capaldi.[17]
This medium can be prepared by any well-trained technician, is not expensive and has in our experience given very satisfactory results.

We prefer screw-capped flat-bottomed tubes for medium for culturing tubercle bacilli. A satisfactory substitute for these tubes are 1 ounce (30 cc.) screw-capped prescription bottles. Human tubercle bacilli grow best in the presence of glycerin while most strains of bovine tubercle bacilli do not grow well, if at all, in the presence of glycerin on original isolation. By culturing specimens on mediums with and without glycerin, it is possible to detect infections due to the bovine type of the organism. The incidence of human infections, including pulmonary tuberculosis, due to the bovine tubercle bacillus is not known so far as the United States is concerned. If all specimens were cultured on nonglycerinated medium, in time some rather important information on this point would be available.

Animal inoculation. Each specimen intended for animal inoculation should be used to inoculate two guinea pigs. If only one specimen is used, the possibility of premature death from intercurrent infection may invalidate the test.

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*This is a modification of a medium suggested by Herrold[16]

The greatest objection to the use of guinea pigs for the demonstration of tubercle bacilli is the relatively long period necessary to complete the test. At our institution for the past ten or more years, the time required for the test on guinea pigs has been materially shortened by the following procedure: Four weeks after the animals have been inoculated, one of the two guinea pigs is given a subcutaneous inoculation of 0.5 cc. of Old Tuberculin. If tuberculous, the animal usually dies within the next twelve to twenty-four hours. If tuberculosis is found at necropsy, the remaining animal of the pair is killed. If the animal that received the tuberculin dies and no evidence of tuberculosis is found, or if it fails to die, the other of the pair is permitted to live for four additional weeks. When tuberculosis can be demonstrated in the guinea pig four weeks after inoculation, the time factor compares favorably with that for the better cultural procedures. Inoculations are made subcutaneously. We prefer the suprasternal region as the site of inoculation.

Histologic diagnosis of tuberculosis. Lastly, the question of diagnosing tuberculosis by histologic criteria should be mentioned briefly. As is true with all of the other methods mentioned except the animal-inoculation method, the diagnosis of tuberculosis by histologic criteria is subject to certain but very definite reservations. Tuberculosis is a granulomatous disease which in some phases of its evolution has a disturbing similarity to other and totally unrelated conditions. Among the conditions that might be confused with tuberculosis microscopically are brucellosis, granulomatous prostatitis, syphilitic lesions and lesions associated with fatty substances in the breast.[18] One of the factors responsible for mistaking nontuberculous tissue reactions for tuberculosis is the apparently deep-seated but erroneous conviction of some tissue pathologists that the Langhans type of giant cell is specific for the reaction to the tubercle bacillus. Regardless of the histopathology, unless acid-fast bacillary forms can be demonstrated microscopically within the lesion of alleged tuberculosis, the accuracy of a diagnosis of tuberculosis by histologic means only may be open to question. As has been emphasized repeatedly, the only unequivocal criterion for the diagnosis of tuberculosis is the demonstration of tubercle bacilli.

Precautionary Hints

The laboratorian should insist on making the procedures designed to demonstrate tubercle bacilli as precise as possible. Scrupulous care and meticulous attention to detail must be practiced if errors are to be avoided or reduced to a minimum. Slides used for smears should be new and chemically clean. The practice of immersing many smears from different cases in the same bath of staining solution, which is used day after day, is subject to criticism. To preclude possible error, either the staining solution should be used only once in a bath or the stain should be applied separately to the individual smears. Only freshly distilled water or a physiologic solution of sodium chloride made from freshly distilled water should be used in the various staining and culturing procedures. Rubber hose extensions to water faucets and siphons to distilled water bottles should not be used in the various staining and culturing procedures. Rubber hose extensions to water faucets and siphons to distilled water bottles are possible sources of acid-fast saprophytes. For the unwary, such bacteria can be responsible for serious error.

Comments on Questions Regarding Certain Laboratory Findings

How should one interpret "positive culture" and "positive smear" as a result of laboratory examinations of certain suspected materials? How may one distinguish tubercle bacilli from other species of acid-fast micro-organisms demonstrated in clinical material? Not all bacilli that retain the basic fuchsin stain or auramine stain in the presence of acid or alcohol are necessarily tubercle bacilli. The genus Mycobacterium contains a considerable number of species other than those responsible for tuberculosis, most of which are nonpathogenic. It is important, therefore, to be alert to the errors that may ensue if one presumes that every smear or every culture that contains acid-fast bacilli indicates the presence in the specimen of genuine tubercle bacilli.[1,2]

In the vast majority of cases in which the clinical evidence suggests tuberculosis, the acid-fast bacilli that may be demonstrated are in fact tubercle bacilli. However, the fact remains that acid-fast bacillary forms that are either atypical or are definitely not mammalian tubercle bacilli occasionally are encountered in specimens from presumably tuberculous patients.

To distinguish such bacteria from genuine mammalian tubercle bacilli is definitely the responsibility of the laboratorian. If the clinician, as a result of the continued study of a given case, becomes conscious of the presence of atypical or unusual features contrary to those characteristic of tuberculosis induced by the human tubercle bacillus, he should request that special laboratory studies be made. Remembering that acid-fastness is the characteristic of all members of the genus Mycobacterium, it is obvious that tests capable of distinguishing virulent from nonvirulent species should be done. The most convincing tests available for this purpose are tests for pathogenicity which are made by using guinea pigs, rabbits and chickens. Typical human tubercle bacilli are highly infectious for guinea pigs but only slightly so for rabbits and not at all for chickens. Guinea pigs and rabbits are highly susceptible to bovine tubercle bacilli while chickens are markedly resistant. Avian tubercle bacilli are highly pathogenic for chickens and rabbits but are essentially nonvirulent for guinea pigs.

Although one may detect by cultural means strains of acid-fast bacilli that are dissimilar to strains of typical and fully virulent human tubercle bacilli, the final decision regarding such strains must be based on tests for pathogenicity.* In specimens consisting of gastric washings or urine in which saprophytic acid-fast bacillary forms may be present, the direct smear or even cultural procedures cannot be accepted as dependable methods for unequivocal demonstration of tubercle bacilli. From a critical point of view, one must recognize that acid-fast bacilli found in smears cannot be identified as tubercle bacilli unless supplementary studies of additional material are made. If the objectives of laboratory procedures are to demonstrate tubercle bacilli rather than acid-fast bacilli, it must be insisted that gastric washings and material from cases in which the clinician entertains a reasonable doubt as to the correct diagnosis be subjected to animal tests for pathogenicity. Although such tests may not always provide results that will enable one to establish definitely the exact taxonomic identity of the organism studied, they will in practically all instances indicate whether or not virulent mammalian tubercle bacilli are present. This is the question of major importance if the clinician is to have adequate information on which to base rational therapeutic procedures.

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*Procedures for determining pathogenicity of the various types of tubercle bacilli are presented in the monograph by Feldman.[19]

AN ADEQUATE ROUTINE FOR DEMONSTRATING TUBERCLE BACILLI

It might be proper to suggest what constitutes an adequate routine for demonstrating tubercle bacilli in material obtained from patients suspected of having active tuberculosis. From what has been mentioned previously it is obvious that no one procedure will provide results that will prove acceptable in all cases. Laboratories called on to provide this service should be staffed with competent personnel and equipped with the requisite facilities to conduct not one but each of the recognized procedures designed to identify the tubercle bacillus. There should be intelligent co-operation on the part of the clinician and an energetic desire on the part of the laboratorian to demonstrate the tubercle bacillus in any material in which the clinician has reason to suspect its presence.

Assuming that the material to be examined is delivered to the laboratory in a satisfactory condition, the specimen should be subjected to the following procedures.

1. *Direct smear examination with carbol fuchsin following concentration if necessary.* No preparation should be considered free of acid-fast bacilli until it has been examined systematically for a period of ten minutes. Conversely, no specimen should be considered definitely positive if only one or two acid-fast bacilli are found.

2. *Cultural methods.* A medium of high efficacy should be chosen. A large-sized specimen should be provided if possible. The specimen should be concentrated by treating preliminary to culture with 3 per cent solution of sodium hydroxide or 5 per cent solution of oxalic acid. Cultures should be incubated for a minimum of eight weeks before being discarded as negative. The growth in "positive" tubes should be stained by the Ziehl-Neelsen technic and examined microscopically.

3. *The inoculation of guinea pigs.* Large guinea pigs weighing 1 pound (0.5 kg.) or more should be used. Two animals should be inoculated with each specimen. Animals of the same sex should be caged together. The suspected material should be injected subcutaneously, preferably suprasternally. Except in instances in which one animal dies as a result of sensitivity to a large dose of Old Tuberculin injected four weeks after inoculation, the animal should be killed for necropsy after eight weeks of observation.

4. *Reporting results.* Results of laboratory findings should be based entirely on objective observations. Consequently, results obtained by examination of direct smears should be reported either as "acid-fast bacilli found" or "no acid-fast bacilli found," as the case may be. It is entirely presumptuous for the laboratorian to report the presence of *Myobacterium tuberculosis* on the basis of the presence of acid-fast bacilli in smears.

Cultures containing colonies of acid-fast bacilli should be reported as "growth typical of tubercle bacilli" or "no growth after eight weeks' incubation." If growth of acid-fast bacilli is obtained which is not typical, further studies including pathogenicity tests should be made before arriving at any conclusions.

Results of animal-inoculation procedures may be reported as "lesions of tuberculosis present" or "lesions of tuberculosis absent."

We would emphasize that the major responsibility for the diagnosis of tuberculosis rests squarely on the clinician. He should be thoroughly cognizant of the various laboratory means by which tubercle bacilli can be demonstrated, and should be familiar with the relative reliability and shortcomings of each. When material is submitted to the laboratory, the clinician should indicate how exhaustive the examination should be. If the search for tubercle bacilli is to include more than the routine examination of smears, the pathologist should be consulted concerning additional procedures.

SUMMARY

This paper is based on a consideration of procedures for the demonstration and positive identification of tubercle bacilli in clinical materials. The one unequivocal factor in the diagnosis of tuberculosis is the demonstration of the causative micro-organism. Due consideration is given to the conventional procedures for demonstrating and identifying tubercle bacilli with emphasis placed on the animal inoculation test. The responsibility of the clinician in the diagnosis of tuberculosis is paramount. The laboratorian should conduct procedures in a meticulous manner and should report his results objectively.

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The Early Diagnosis of Carcinoma of the Lung

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Considered a rare disease 25 years ago carcinoma of the lung is today recognized as one of the common causes of death in individuals past the age of 40. It has been estimated that 6.8 per cent of all cancers occur in the tracheobronchial tree; by some authorities the respiratory tract is considered to be the third most common location for a fatal tumor. This particular cancer seems to be increasing in frequency absolutely as well as relatively, as is evidenced from the experience of many observers. Autopsy studies, for example, show a distinctive increase beyond that which might be expected from the aging of the population. The statistics cited by Westermark based on autopsy material in Stockholm are of great significance in this regard. In 1910, Nystrom found amongst the autopsies done in Stockholm a ratio of one carcinoma of the lung to every 75 carcinomas of the stomach. In 1939 Westermark studied the material from somewhat the same institutions and found the ratio to be one pulmonary carcinoma to six gastric carcinomas. More than a tenfold increase in the ratio between these two malignant lesions occurring in much the same age group gives some conception of the increasing importance of the lung as a location of primary tumors.

The development of a curative surgical procedure, pneumonectomy, has accentuated the importance of the early diagnosis of bronchogenic carcinoma. Furthermore, the increasing effectiveness of certain chemotherapeutic agents in cancer gives promise for the future, making it all the more important that we fully appreciate the possibilities of diagnosis in tumors of the lung. A reduction in the immediate mortality following pneumonectomy to the low figure of 5 per cent as reported by Jones and the demonstration of fairly large numbers of five year as well as even some ten year cures gives distinctive hopes for the salvage of cases of carcinoma of the lung. The fact is that many bronchogenic carcinomas are not of very high grade malignancy and if found early may respond well to radical extirpation.

As is the case in most internal cancers the onset of bronchogenic carcinoma is insidious. The symptoms are often deceptive, the physical signs are frequently absent in the early stages and, when they are found, are difficult to interpret. Carcinoma of the lung is, no doubt, the great imitator of all other pulmonary diseases. Furthermore, it is imitated by many other pulmonary diseases in its symptoms and physical signs. As a result it is uncommon that strenuous diagnostic efforts are seriously attempted in the earliest stages of the disease. It seems so logical to assume that a man developing a cough with possibly some rusty sputum and a low grade fever is suffering from one of the numerous atypical forms of pneumonia or recovering slowly from a previous attack, that efforts at further study are often not made. Furthermore, in many cases, the symptoms are almost nil at a time when the tumor is already beginning to develop to a serious degree.

Definitive diagnostic signs likewise are not easily obtained. Aside from exploratory thoracotomy with the diagnostic biopsy, a procedure which perhaps should be more frequently used, the best method for a conclusive diagnosis of a bronchogenic tumor is bronchoscopy with a biopsy obtained by this method. Unfortunately, bronchoscopy is often not readily available, cannot be used practically for a routine procedure and frequently is contra-indicated. Furthermore, it may be unsuccessful in a considerable percentage of cases, especially in the upper lobe tumors where it is difficult for the bronchoscopist to reach the area of involvement. In the peripheral tumors, likewise, the difficulties are even more severe. It has been estimated that not more than 50 per cent of the lung tumors which now come to operation are positively diagnosed by the bronchoscopic method. This would indicate that it is necessary frequently to make the diagnosis, at least to the fullest probable extent, without the aid of bronchoscopic biopsy.

It is not within the scope of this discussion to go into the many other procedures which may be used for the definitive diagnosis of bronchogenic carcinoma. Such porcedures as histological examination of bronchoscopic aspirates, the examination of the sputum by the Papanicolaou method of staining, the study of pleural fluids for cancer cells, and many others may be helpful although they are of limited usefulness.

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There is general agreement that the first evidences leading to the diagnosis of a bronchiogenic tumor must be obtained by X-ray examination. With the institution of routine chest surveys by the roentgen method on a wide scale, it seems clear that many early tumors will be discovered even before the onset of symptoms. The routine use of the fluoroscopic examination of symptomless patients has resulted in an occasional discovery of carcinoma of the lung which was quite unsuspected. Likewise the utilization of roentgen examination at the very first appearance of pulmonary symptoms, a procedure which is, fortunately, being more and more widely adopted, will eventually result in the roentgen observation of larger numbers of lung tumors in the earlier stages of their development. The earliest roentgen signs suggestive of carcinoma must, therefore, be clearly understood.

It should be noted that when the chest area is under consideration it is relatively easy to do widespread examination of the population on a mass survey basis or individual examinations of patients who come in with symptoms of pulmonary pathology. For the routine survey of the lung by the X-ray method is a procedure which is relatively simple and there is no good reason why it should not be universally employed; in that way, only, will early lesions be frequently discovered.

The discovery of a pathological process in the lung, however, is insufficient since it is necessary to establish not only its neoplastic but also its malignant character. This is particularly difficult in the case of a pulmonary tumor because there we have a lesion, which on X-ray examination as well as in its symptoms, is the great simulator of pulmonary pathology. From the roentgen standpoint, the most characteristic feature of bronchogenic carcinoma is the multiformity of its manifestations.

A lesion which produces a tumor mass, either central or peripheral, which gives a shadow because of its own density, necrosis with abscess formation or other more diffuse inflammatory changes, such as multiple abscesses or pneumonic changes, bronchial obstruction with all its multitudinous consequences, and regional lymph node metastases, will obviously simulate any of the numerous diseases which invade the lungs and mediastinum. The roentgen findings, therefore, are very complex and the final diagnosis is most difficult. Nevertheless, there are often many signs which indicate the presence of a lung tumor and thereby may stimulate further study by all the means available to determine the exact nature of the condition. What is of the greatest importance is the recognition by roentgen examination in the early stages of the disease that a tumor may be present in order to stimulate such further investigation.

It should be noted that we have come a long way from the simple routine stereoscopic roentgenograms of the chest which used to be the common denominator of all X-ray examinations of the lung. It should be emphasized that further studies must be made whenever the photofluorographic or simple film examination indicates the possibility of a tumor. Various procedures of roentgen examination must be undertaken in all such cases. Thorough fluoroscopic examination serves as a sort of scouting expedition to determine the possibility of a lesion being present. It is particularly important to examine the patient in expiration as well as in inspiration and to rotate the patient to various positions in order to discover localized areas of atelectasis, emphysema, or tumor formation. A simple postero-anterior roentgenogram of the chest will likewise often give an indication of the presence of a tumor; where it is possible to do so, films should be made in expiration as well as in inspiration. Following this procedure, if there is evidence to suggest a process, further studies should be undertaken with films in a variety of positions to bring out more clearly the segmental anatomy of the lung and thereby to indicate to some degree which bronchus is involved. Following this, body section roentgenography can be undertaken in order to delineate the bronchi more exactly and, in many instances, the exact site of the tumor and even the tumor mass itself can thus be demonstrated. Finally, if this is not entirely satisfactory, bronchography with iodized oil should be undertaken and by this means, in most cases, the exact site of the obstruction of the bronchus and the character of the process can be determined. Such a thorough survey will commonly result in the exact demonstration of the presence of a tumor.

Obviously, as has been previously stated, the best means for establishing definitively the diagnosis of carcinoma of the bronchus is bronchoscopy with biopsy. When this is possible it should, of course, be used in addition to the various roentgen procedures which have already been outlined.

The X-ray findings in tumors of the lung are by their very nature most variable. First, one may demonstrate the tumor itself either as a dense, often very rounded, rather sharply demarcated shadow well out in the periphery of the lung or as a density right around the lung root with radiating irregular outer margins. The latter is the more common, of course, since the majority of carcinomas of the lung arise in the larger bronchi. There is another type of tumor, the so-called pulmonary sulcus tumor, which arises in the apex of the lung producing a triangular-shaped density extending down toward the root by infiltration. Such tumors, often accompanied by Horner's syndrome, frequently eventuate with erosion of the rib. There is still another type of tumor which is of an infiltrating variety extending from the hilum, often into the upper lobe, which is, therefore, frequently mistaken for tuberculosis. Finally there is a much rarer massive tumor which tends to grow with great rapidity filling one entire hemithorax and displacing the mediastinum and heart to the opposite side. In all of these described above the X-ray findings are due directly to the shadow of the tumor itself.

Unfortunately, carcinomas of the lung take on the aspects of inflammatory lesions so commonly that a large part of our difficulty lies in this differentiation. They break down and form large abscesses which may appear similar to an ordinary pulmonary abscess. There is one difference: in most carcinomatous abscesses a density can be made out representing a mass of tissue around the outer wall of the cavity which helps to distinguish it from an ordinary lung abscess. Multiple abscesses may occur and with that a diffuse infiltrative process through the lung is shown on X-ray examination. Often the appearance is similar to that of unresolved pneumonia and may be confused with it. In some instances they resemble the appearance of fungus infections. There is another type which begins much as would a pneumonia and both clinically and roentgenologically may be mistaken for pneumonia. The differential diagnosis here lies in the fact that the lesion does not disappear as is the case in ordinary pneumonia.

More important, perhaps, in the early diagnosis of carcinoma of the lung is the fact that the tumor obstructs the bronchus and, as such, produces a series of findings which have little to do with the size or growth of the tumor itself aside from the fact that the tumor is within the bronchus and is producing the sequelae of bronchial obstruction. We may then get a band-like shadow of increased density in one lobe representing a narrow area of atelectasis. The tumor may obstruct the entire lobar bronchus and thus produce a massive atelectasis involving an entire lobe. The characteristic features of atelectasis, retraction of the fissures of the lobe, elevation of the diaphragm and retraction of the mediastinal structures toward the side of the lesion, will be present. In some cases, the main bronchus is obstructed and the entire lung will be involved by the process. In other instances the lung may take on a drowned appearance owing to the retention of large quantities of fluid within the bronchi and to the excessive amount of blood which flows into such an atelectatic lung. Under such circumstances there will not be as much displacement of the mediastinum or diaphragm but the density will still be greatly enhanced.

If the tumor is slow growing, such as is the case in the so-called benign adenomas, with long-standing obstruction, bronchiectasis may be one of the early signs. It should be emphasized that a localized, unilateral or unilobar bronchiectasis, without other apparent cause, should always bring to mind the possibility of a tumor of the bronchus, either benign or malignant.

In certain instances, tumors of the bronchi will produce emphysema rather than atelectasis. This may be an early process in which the tumor incompletely obstructs the bronchus so that air can get in but cannot get out and thus over-distends either a lobe or a lung. Such areas of emphysema may be well localized around the tumor or may involve a lobe or a whole lung. Under such circumstances films made during expiration are much more valuable in diagnosis since the distention of the obstructed lung will be emphasized. In all probability it would be wise to make films routinely in expiration as well as inspiration in order to determine the presence of tumors at an early stage.

By means of body section roentgenography, often called tomography, planigraphy or laminography, the delineation of the bronchi and of masses around the hilum can be effectuated to a much greater degree than in ordinary films. The procedure consists of moving the film and the X-ray tube during the course of the exposure in such a way as to blur out all of the structures in front or behind a certain plane in the thorax, the latter being the only layer of tissue which appears sharply defined. This is a very helpful maneuver in the diagnosis of lung tumors. By means of it we may be able to demonstrate the shadow of the tumor within the lumen of the bronchus itself, outlined by the air within the bronchus, or we may be able to demonstrate the closure of one or more of the bronchi with no air extending beyond them. The lesion in the lung may become more obvious, since the overlying structures are blurred out and localized areas of bronchiectasis, emphysema, cavitation, or tumor formation become much more demonstrable in such films. In our hands, planigraphy has been extremely useful, particularly in the case of tumors of the bronchi. Planigraphy has been especially helpful in the diagnosis of benign tumors but there has been considerable success in the demonstration of the malignancies as well. By this method we have succeeded in demonstrating the shadow of the tumor itself without any additional aid. This is of the first importance since such a demonstration tends to produce a definite diagnosis even without bronchoscopy or bronchoscopic biopsy.

Bronchography is of a similar character and is desirable because it gives somewhat more positive, more easily interpreted findings than is the case with body section roentgenography. The introduction of an iodized oil into the trachea or bronchial tree by a variety of methods is of the first importance in the diagnosis of tumors of the lung. The outline of the bronchi desired can thus be ascertained with a great deal of accuracy and obstructions of various kinds can be determined. The tumors of the bronchi usually produce fairly characteristic types of obstruction. One of these is a cap-shaped defect in the bronchial lumen, with the walls of the bronchus extending around it. Another is a marginal, ragged defect within the outline of the contrast medium similar to that seen in carcinoma of the stomach. More commonly, the terminal portion of the bronchus will be frayed out, elongated and extremely narrow or completely stenosed in a fairly characteristic fashion, often designated the "rat-tail" deformity.

With findings of this type it is possible to make a definitive diagnosis which is sufficiently positive to justify surgical exploration if no contra-indications are present.

Obviously, there are many other findings in carcinoma of the lung which have not been detailed here. Most of these are related to the regional lymph node metastases which are so common. The presence of a mediastinal mass, a group of enlarged lymph nodes, either peritracheal or peribronchial, usually suggests a carcinoma if there are findings in the lung as well. Usually such changes are present when the tumor is well advanced and need not be considered further here. It is important to note, however, that the appearance of a rounded or lobulated shadow in the mediastinum on the same side as a dense shadow in the lung should always suggest that the lesion is a tumor rather than an inflammatory process.

Recently we have had the experience of observing the roentgen findings in some cases of carcinoma of the lung at a stage when the symptoms were minimal or absent. In some of these the X-ray examination had been done as a routine procedure; in others it resulted from vague symptoms such as malaise, fatigue, weight loss, asthmatic attacks and others of similar nature. In a number of these cases it would have been possible to suspect the diagnosis of lung carcinoma from the roentgen examination even though the findings were so minimal that the roentgenogram was considered to be negative.

Among the early signs in this series of cases was increased radiability of one lobe or one lung, the result of obstructive emphysema. Another finding was a moderate enlargement of one of the hilum shadows, easily overlooked as within normal limits, but actually distinctly abnormal as compared to the opposite side. In one case the abnormal finding was a small, sharply defined, round peripherally-situated dense shadow. In these cases the findings were not observed or correctly interpreted and an unfortunate delay took place before the correct diagnosis was made. A review of the films, in the light of our present knowledge, indicated clearly, however, that the diagnosis could have been suspected and no doubt could have been definitively determined, even at such an early stage.

Much could be written as to the differential diagnosis but that is not within the scope of this paper. It should be pointed out, however, that not all obstructions of the bronchus are tumorous and that inflammatory bronchostenosis of tuberculous or non-tuberculous origin may simulate a tumor in some instances. It should also be pointed out that peripheral tumors cannot always be diagnosed absolutely by any means except by surgical exploration which is often justified in order to determine the diagnosis early.

Under present conditions, any patient, particularly one over the age of 40, with respiratory symptoms of any degree is entitled to an X-ray examination done properly and competently interpreted. Such a patient is also entitled to further follow-up studies if there are any findings at all suggestive of carcinoma of the lung. Only in this way will we have any opportunity whatever of salvaging patients afflicted with this dreadful disease.

Bronchoscopy and the Chest Survey

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MANY diseases of the chest besides pulmonary tuberculosis will undoubtedly be revealed when a routine chest X-ray is made of thousands of people. An exact diagnosis cannot always be made by such an X-ray alone, therefore further clinical, laboratory and X-ray studies may be required. In some cases, particularly those with bronchial obstruction, a bronchoscopy will be necessary to discover the exact nature of the disease.

Bronchial obstruction will be one of the most important problems. It may be caused by neoplasms, foreign bodies, tuberculous bronchitis, thick secretions in inflammatory diseases or asthma, granulation tissue, anatomical anomalies, benign strictures or extra bronchial lesions. Partial obstruction results in obstructive emphysema. Total obstruction produces atelectasis, which may eventually lead to drowned lung, abscess formation, bronchiectasis or gangrene. It may be complicated by pleural and mediastinal diseases. The X-ray will demonstrate these numerous phases of bronchial obstruction, but cannot always differentiate the etiology.

By means of the bronchoscope a direct visual examination of the bronchi can be accomplished. The visualization of the entire bronchial tree is impossible. The smaller bronchi cannot be entered or seen and the upper lobe bronchi, "around the corner," are impossible to inspect. However, these unseen structures may be aspirated with a flexible, curved tube or explored with a bronchoscopic forceps. In this way, it is occasionally possible to obtain tubercle bacilli or cancer cells which are impossible to find by any other means.

The chest survey, now being conducted in Minneapolis, is the culmination of the efforts of many people. The originator of the idea is not known to me, but the pioneer bronchoscopist, Chevalier Jackson, proposed a routine chest X-ray of the public many years ago. He reported a large group of cases, in each one of which a foreign body lodged in a bronchus was unsuspected until discovered by the X-ray. He suggested that if everyone had a chest X-ray, many neglected foreign bodies would be found. His proposal was not considered seriously until the purpose was changed from discovering foreign bodies to discovering tuberculosis.

While the primary purpose of the present survey is to discover pulmonary tuberculosis, it is quite possible that some unknown foreign bodies may be found. A few years ago the interns at the Minnesota University Hospital had their chests X-rayed. One young man was greatly surprised to find a foreign body in his esophagus.

Since Jackson's work, neglected foreign bodies are not so commonly seen. The public, both medical and lay, are well aware that foreign bodies can and should be promptly removed. It will be interesting indeed to learn how many foreign bodies will be discovered in the present survey.

Tuberculous Bronchitis: Bronchoscopy has, within the past few years, been largely responsible for the recognition of tuberculous bronchitis. The importance of this condition in the study and management of pulmonary tuberculosis is generally accepted. In our experience at the Glen Lake Sanatorium, we have found this condition much more frequently in women than in men.

The lesion varies from the ulcerating or granulomatous stage to the healed fibro-stenosis. It has never been seen at Glen Lake except associated with parenchymal tuberculosis.

In children, bronchial tuberculosis is usually due to the peneration of a bronchial lymph gland. It produces the same X-ray findings that a non-opaque foreign body does. Only by examining the bronchoscopically obtained tissue can the exact diagnosis be made.

A Broncholith is a calcified lymph gland which has eroded the bronchial wall and invaded the bronchial lumen. It is a foreign body of endogenous origin and may produce the same effects as any foreign body. It should be removed bronchoscopically.

Carcinoma of the bronchus is still not diagnosed in its early stage as frequently as it should be. Only the early case can be cured by surgery. The chest survey will bring to light some cases of cancer of the bronchi, and it will be instructive to learn how many and in what stage. The early diagnosis of cancer is not the object of this survey and it would be surprising if many early cases were found. The early diagnosis requires films made at both expiration and inspiration in order to demonstrate obstructive emphysema, which is diagnostic of partial bronchial obstruction.

Bronchoscopy should be employed in all such cases, as the biopsy is the surest proof of the diagnosis. A negative biopsy does not rule out cancer. The best figures today are 75 per cent of positive biopsies obtained by bronchoscopy.

Metastatic carcinoma will also be revealed in the chest survey. Invasion of the bronchus is rare in this condition, so bronchoscopic diagnosis is usually impossible. Sarcoma, Hodgkin's disease, hypernephroma and other neoplasms of the lung or chest wall will undoubtedly be discovered also.

Benign tumors of the bronchi, such as fibroma, chondroma, lipoma or papilloma may occur, but they are extremely rare. Bronchoscopy makes the diagnosis, and in some instances, the treatment of choice is bronchoscopic removal.

Adenoma is a much more common tumor. Its diagnosis by biopsy has caused the pathologists a great deal of trouble. Its treatment has caused the bronchoscopist many disappointments, principally because it was not recognized that these tumors often have an extra bronchial portion which cannot be reached through a bronchoscope. Surgical extirpation is the treatment of choice.

Cylindroma may be confused with adenoma. It is important to make the differentiation because cylindroma will frequently respond to X-ray therapy, but adenoma will not.

Pulmonary abscess may be one result of chronic bronchial obstruction. Bronchoscopic treatment of the obstructing lesion, such as a foreign body, granulation tissue or thick secretion, may be of great value. Surgical drainage is indicated, if the response to bronchoscopic treatment is not prompt.

Bronchiectasis is not easily diagnosed nor satisfactorily treated by bronchoscopy unless there is some evidence of bronchial obstruction. Repeated bronchoscopic aspirations may make the patient more comfortable. If the disease is localized, but far advanced, there are times when aspiration may be of great help, even keeping the patient alive until his condition is suitable for surgery.

Conclusion

Bronchoscopy is indicated when there is X-ray and clinical evidence of bronchial obstruction. The true nature of the lesion should be known, in order to carry out the proper treatment.

MASS CHEST X-RAY UNITS IN GREAT BRITAIN

Since 1944, increasing numbers of *early* cases of tuberculosis are reporting at Chest Centres throughout the country. This welcome development is the outcome of the new Mass Miniature Radiography Units distributed on a regional basis. The equipment of this Unit is capable of photographing 700 or 800 tiny 35 mm. film strips per day at the cost of a few pence each and is employed to discover early tuberculous lesions in apparently healthy human beings. A number of investigators have established that about 1 per cent of the entire population are found to show evidence of tuberculosis, though of the above, only about 0.4 per cent are in need of some form of therapy. Clearly with the production of increasing numbers of such Mass Miniature Radiography Units, we shall be in a position to comb out an increasing number of incipient cases of tuberculosis which are especially suited for both dispensary and sanatorium treatment.

All patients, whether referred by their own doctor or via the Mass Miniature Radiography Unit, are weighed, clinically investigated, X-rayed and have a routine examination of their sputum for the presence of tuberculosis germs carried out at the dispensary. A diagnosis and, if this be positive, an assessment of the degree of disease are now made. Finally, recommendations as to treatment and eventual "disposal" of such a new case are advised by the tuberculosis specialist.—From *Britain Faces Her Tuberculosis Problem,* by B. Mann, in *Health Horizon,* April, 1947.

The Value of Chest X-Ray Survey in the Diagnosis of Cardiovascular Disease

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THE Minneapolis community-wide chest X-ray survey sponsored by the Hennepin County Medical Society and the Hennepin County Tuberculosis Association offers a free chest X-ray to every adult in the community. In addition to discovering adults with abnormal pulmonary conditions, this survey may be of considerable value in the discovery of heart disease.

Various cardiac lesions may cause changes in the contour of the cardiac silhouette or in the prominence of the great vessels. It is true that individuals with serious heart disease such as arteriosclerosis of the coronary arteries may have entirely normal cardiac shadows in the X-ray film. Cardiac abnormalities which may be detected by other forms of radiologic examination may not be apparent on the posterior-anterior view obtained in the routine chest film. Although it must be admitted that the X-ray survey cannot be 100 per cent effective in detecting individuals with cardiovascular disease, it may be a very useful device. It is the purpose of this paper to discuss briefly the cardiovascular diseases which may be discovered by this survey.

Enlargement of the left ventricle may be detected by the chest X-ray and may be due to any one of the following causes: hypertensive heart disease, arteriosclerotic heart disease, chronic rheumatic valvular heart disease with aortic stenosis and/or insufficiency, luetic aortic insufficiency and other less common cardiac lesions. Localized enlargement of the lower left cardiac border may be found in aneurysm of the left ventricle following coronary thrombosis with myocardial infarction. Right ventricular enlargement may be manifested by an increase of the heart shadow to the right of the midline. Commonly, however, moderate or even marked enlargement of the right ventricle may cause an increase in the heart shadow to the left. The posterior-anterior projection does not always, therefore, in itself give adequate information as to which chamber of the heart is enlarged.

An increased prominence of the pulmonary trunk and pulmonary artery shadow on the superior portion of the left heart border may be found in mitral stenosis, interauricular septal defect, patent ductus arteriosus, pulmonary arteriosclerosis, chronic cor pulmonale and thyrotoxicosis. It may also be present when the left side of the heart has decompensated as in hypertensive heart disease.

Relatively diffuse cardiac enlargement may occur in myxedema, thiamine deficiency, anemia and myocarditis. In myxedema, the cardiac contour may be globular.

Pericardial effusion may be manifested by cardiac enlargement to both right and left with fairly convex lower heart borders. Chronic constrictive pericarditis may be suggested by deposits of calcium seen in the cardiac shadow. Distention of the vena cavae may be caused by constrictive pericarditis and may be detected on the routine chest film.

Abnormalities in the thoracic aorta may be found by this survey. Arteriosclerotic or syphilitic aneurysm of the aorta may present a striking X-ray appearance. Lesser degrees of tortuosity and ectasia may commonly be seen in adults of the older age groups. Deposits of calcium may be seen in the aortic knob. Decreased prominence or absence of the aortic knob may suggest coartation of the aorta. This is especially true if scalloping of the rib margins and left ventricular enlargement are present. Abnormalities in the origin or course of the aortic arch may also be found.

Congenital cardiac lesions may be detected through this survey. The tetralogy of Fallot may be suggested by the combination of the peculiar boot-shaped heart plus the anemic appearing lungs. Interventricular septal defects may cause enlargement of both the left and the right ventricle. Dextrocardia will be evident by the striking X-ray appearance of the chest. Other congenital cardiac lesions have been mentioned above.

It is essential that those individuals whose routine X-ray films show cardiovascular abnormalities be referred to their physicians for further studies. Only by obtaining a careful history and physical examination and by making judicious use of the electrocardiogram, other forms of radiologic examinations, and other laboratory procedures can an exact diagnosis be arrived at and proper management instituted. It is possible that some completely curable cardiac lesions may be discovered by the survey. The health of other individuals with cardiac disease may be preserved by regulating activity to an optimum level and by applying appropriate therapeutic measures.

The value of this survey to the health of our community is impossible to estimate. It will depend in large measure on how well we, the physicians of the community, perform our task of arriving at an exact diagnosis and advising appropriate therapy.

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Tuberculosis in Pediatric Practice

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Optimism over the complete eradication of tuberculosis as a major cause of illness and death in the United States seems justified. Some estimate that this goal may be reached in as short a time as a generation or two. Should a drug such as streptomycin, in the meantime, prove to be effective against the disease, the time would, of course, be shortened.

A glance at recent statistics gives the basis for such optimism. In 1944 the tuberculosis mortality rate was 41.3 for all forms of tuberculosis, and if the pulmonary type alone is considered the rate was only 38.3. Contrast this with the rate of 201.9 deaths per 100,000 population for the U. S. Registration Area in 1900. Tuberculosis now occupies seventh place in the list of causes of death instead of first place where it stood for so many years. While it was once held that tuberculous infection after the tenth year of life was practically universal, it is now probable that considerably less than one-half of the adult population reacts positively to tuberculin, and the proportion of young persons reaching adult life with negative tests is steadily growing. The Committee on Tuberculosis of the American Student Health Association reported for the year 1942-43 that among 208 colleges and universities representing a total student enrollment of 300,144, the incidence of positive reactors was 18.6 per cent. In some rural schools in the Middle West, as few as 6 to 10 per cent of the children react positively to the tuberculin test. Indeed, in one four-county sanatorium district in Minnesota in 1946, out of 240 schools surveyed not a single reactor was found in 183 of them. When a similar result has been achieved for a majority of the counties of the nation the conquest of human tuberculosis will have become as successful as has the conquest of bovine tuberculosis by the veterinarians.

But in spite of these encouraging indications, a monumental task yet remains to be accomplished. Great progress was made during the war when millions of young men were examined for tuberculosis by roentgenograms of the chest. This important work is being carried on throughout the country among the civilian population by means of mobile X-ray units using micro-film. The objective, of course, is to locate persons harboring tuberculous disease so that they may be isolated and brought under treatment at the earliest possible moment. The purpose of this article is to stress the contribution that physicians, in their everyday practices among children, can make in this final concerted drive against one of the worst scourges of mankind. In the following paragraphs, diagnostic tuberculin, pathogenesis of the common forms of tuberculosis encountered in children, and their diagnosis, prognosis, prevention and treatment are discussed.

In diagnostic tuberculin the physician has at his disposal one of the most specific of all the specific tests available for the detection of disease. It should be used as routinely in one's daily practice to exclude tuberculosis as is the Wassermann or a similar test to exclude syphilis, or tests of the urine for sugar and albumin to exclude diabetes and nephritis, or the agglutination tests for typhoid or malta fever. Negative tests may be as significant as positive tests. Recently a ten year old girl was under observation because of a lesion of her lower thoracic spine of many months duration which had resulted in a kyphosis. X-ray films were interpreted by the roentgenologist and orthopedist as tuberculous spondylitis. However, her tuberculin test, even with 5 milligrams of O.T., was consistently negative. Operation became necessary because of pressure on her spinal cord. Examination of material removed proved the lesion to be due to an osteogenic sarcoma. Repeated experiences such as this over a good many years have led me to be extremely reluctant to accept any lesion as tuberculous, however suspicious, when properly performed tuberculin tests with reliable materials are negative.

True, there are a few exceptions in which tuberculin tests may react negatively even when a tuberculous infection exists. These may be enumerated as follows: first, in the pre-allergic period, that is, after infection occurs but before allergy develops; second, during certain of the acute communicable diseases, such as whooping cough, measles, scarlet fever, and diphtheria; third, when the tuberculous lesions have become completely healed (no viable bacilli) so that no tuberculoprotein reaches the circulation; and fourth, when overwhelming tuberculous disease depresses tissue reactibility to a state of anergy. With these few exceptions, the tuberculin test may be accepted as providing a very efficient method for sifting out those who have not been so infected. Furthermore, a negative test in a child offers the strong probability that the members of his family with whom he is in close contact are also free from tuberculous disease, at least in a communicable form.

In evaluating the meaning of a positive reaction to tuberculin, one must remember that sensitivity of all the tissues of the body results within a few weeks following the establishment of the primary infection. Since allergy thus created continues in the majority of individuals throughout life, it follows that a positive reaction at any age denotes only that a primary infection has taken place. Its diagnostic implications, therefore, extend no further than this. For location, extent, activity and stage in the evolutionary course of the disease, other methods of study must be undertaken. Furthermore, no significant correlation exists between the size of the reacting area and the amount or activity of the tuberculous disease present.

However, a positive reaction to tuberculin is significant in several other respects. In the first place, it means that the child has at some time been in contact either with a human or bovine source of infection. Herein lies one of the most important contributions the pediatrician or the general practitioner can make in the conquest of tuberculosis. By doing routine tuberculin tests on his child patients, the physician may be able to uncover an hitherto unsuspected source of contagion.

The younger the child who shows up with a positive test, the more likely it is that the source of the tubercle bacilli is someone in the immediate family. Old persons with chronic coughs should particularly come under suspicion; but the job is not done until every member of the family as well as other possible sources have been investigated for tuberculosis. The grave importance of locating the spreader of tubercle bacilli is too well known to need further comment. However, that the child with a positive tuberculin test can frequently lead to the detection of an open case of tuberculosis is a fact not taken advantage of as frequently as it should be.

Finally, a positive test in a child identifies the individual who must be kept under observation for the possible development of chronic pulmonary tuberculosis at some future date. This form of tuberculosis rarely makes its appearance before the age of puberty, but knowledge of pre-existing sensitivity to tuberculin at or before this time singles out those who should have yearly chest roentgenograms, not only during the teen age period when the incidence of pulmonary disease is high, particularly in girls, but for years afterwards. It is conservatively estimated that one out of every ten children with a positive reaction sooner or later develops chronic pulmonary tuberculosis. Here again the physician in private practice has a real responsibility for detecting this form of tuberculosis at its very beginning, before the patient has become a spreader of organisms and while treatment is promising and relatively simple. Such early recognition is possible only by roentgenography. Early diagnosis based upon symptoms and physical findings invariably means far advanced tuberculosis. A passing thought which might be recorded here is that if the present vogue of X-raying chests of children with miniature films leads to a decrease in the use of diagnostic tuberculin, much information of value in the control of tuberculosis will be lost.

PATHOGENETIC DEVELOPMENT OF TUBERCULOSIS

Tuberculosis is essentially a biphasic disease consisting of primary and reinfection phases. The primary phase most frequently occurs in childhood, and formerly was referred to as "childhood type of tuberculosis." However, it also occurs in adults and with increasing frequency in recent years for the simple reason that fewer children are being infected. The term "reinfection phase" has supplanted the older term of "adult type of tuberculosis," largely for the reason that while it most commonly occurs in adults it may also occur in children. There are certain fundamental differences between these two phases.

Primary Tuberculosis	*Reinfection Tuberculosis*
1. Organism seeded on non-allergic tissues.	1. Organisms seeded on allergic tissues.
2. Progression occurs readily via lymphatics to regional lymph nodes.	2. Little tendency for involvement of regional lymph nodes.
3. Spread by lymphohematogenous route characteristic.	3. Chief method of spread is by contiguity and bronchogenic.
4. Marked tendency for lesions to recede and calcify.	4. Tendency for lesions to progress, to cavitate, and to spread.
5. As a rule evidences of illness are slight.	5. Accounts for practically all of major morbidity and mortality from tuberculosis.

The precise definition of these two phases is still a matter of controversy. Myers is the chief exponent of the view which restricts the definition of the primary phase to include only the lesions set up as the direct result of the initial infection in the period before allergy becomes established. Any new set of tuberculous lesions occurring subsequent to the development of allergy and outside of the original lesions is considered as belonging to the reinfection phase. Diagnostic Standards for 1940, on the other hand, defines the primary phase as including all forms of tuberculosis which follow directly and uninterruptedly the first implantation of tubercle bacilli. Thus, tuberculous pneumonia, miliary tuberculosis, and tuberculosis meningitis are classified as belonging to the primary phase, whereas in Myer's conception these are classified as acute reinfection forms. The essential difference in these points of view would seem to be largely in their prognostic implication. Myers considers primary tuberculosis as a routinely benign disease, but it cannot be regarded as such, particularly in young children, if one accepts the definition advanced by Diagnostic Standards.

While primary infections may occur in the abdomen, in the cervical region, or in the skin, by far the commonest route (over 90 per cent) is by way of the respiratory tract. The first effect of inhalation of virulent tubercle bacilli is the establishment of single or multiple foci of tuberculous pneumonia in some part of the lung, usually close beneath the pleura. Bacilli multiply here and are carried by the lymphatics to one or more of the regional broncho-pulmonary lymph nodes. The pulmonary focus and lymph node focus together constitute the "primary complex of Ranke."

Allergy becomes established within two to seven weeks from the time of the initial infection. Subsequently the lesions of the primary complex usually undergo a process of gradual retrogression, encapsulation, calcification, and occasionally ossification. Viable tubercle bacilli may remain locked up in these calcified foci for months, years, or even the lifetime of the individual. The complete developmental course of the primary phase most frequently runs its entire course without the knowledge of the patient, family or physician. In approximately three-fourths of children who have undergone this experience, the only residual evidence is a positive tuberculin reaction. Of the remaining 25 per cent, the majority will show in the X-ray film characteristic calcified foci either in the lung parenchyma, hilus nodes, or both.

Occasionally, and most often in young children and those known to have been exposed, the lesions of the primary infection may be detected by the X-ray in the early or fresh state. In such cases, symptoms and mild physical findings may be present. The most important symptom appearing at this time is fever. It usually begins coincidentally with the development of allergy and continues for a week, a month or even longer. However, there is little to distinguish this fever from that occurring in ordinary acute infections so that its significance is frequently not realized unless a positive tuberculin reaction raises the possibility. Temporarily, the fever may be accompanied by lassitude, anorexia and failure to gain weight, but on the whole the evidences of illness are slight. Physical findings are usually meager or absent altogether, even when rather prominent pneumonic shadows are revealed in the X-ray film. Occasionally, however, a few rales or changes in breath sounds may be elicited over the involved area.

The cause of these pneumonic shadows has been the subject of some debate. Eliasberg and Neuland in 1920 employed the term "epituberculosis" to describe them in the belief that although they occurred in tuberculin sensitive children, they were of a non-tuberculous nature. More recently the suggestions have been advanced that they represent atelectatic areas due to obstruction of a bronchus from lymph node pressure or to obstruction from allergic swelling of the mucous membrane inside the bronchus. The prevailing view, however, favors the belief that the cause of these shadows is an allergic inflammatory reaction about a tuberculous nodule and its surrounding zone of tubercles. The further course of these pneumonic infiltrations is usually one of slow retrogression over weeks and months, the densities often persisting long after symptoms and physical findings have subsided. Central caseation probably occurs in most of them, but rarely are cavities demonstrated by X-ray. The eventual outcome is one of slow resolution, either to complete disappearance of the lesions, to a few fibrous strands along the course of the lymphatic channels leading to the lymph node component, or to calcified deposits (Ghon tubercles) in the caseous centers.

While hilus gland tuberculosis is invariably associated with the pulmonary component of the primary complex, at times it may appear to be present alone. The tuberculous lesions exist in the nodes as caseous, partly caseous and calcified, or calcified. Occasionally the caseous stage is considerably prolonged but, as a general rule, encapsulation, resolution and calcification more or less parallel similar changes in the pulmonary focus. In the majority of instances, the caseous nodes are not sufficiently enlarged to be visualized in the X-ray film. Symptoms are either absent or of such a mild general character that no specific significance can be attached to them, and even if the tuberculin reaction is positive a definite diagnosis cannot be reached until serial X-ray studies reveal the beginning deposition of calcium. With a further increase in severity, some of the nodes may protrude beyond the margins of the mediastinum and become demonstrable in the X-ray film as characteristic rounded knobs. In this stage, fever, anorexia, anemia, hoarseness, and a bitonal cough may or may not be present.

Rarely, and again usually in the early years of childhood, massive enlargement of the mediastinal nodes literally chokes the whole area in the vicinity of the root of the lung resulting in compression of the bronchi, trachea, esophagus, blood vessels or nerves. Under such circumstances, severe and alarming symptoms may develop. The usual course of hilus gland tuberculosis however is one of healing by resolution and calcification over a period of from six months to two or three years.

Again, and most often in infants and young children where the opportunities for massive doses of bacilli are greatest, the lesions of the primary complex may not promptly retrogress, but on the other hand may undergo progression and extension. Thus, progress may occur at the site of the primary pulmonary infiltration by contiguity, leading sometimes to a large excavating pneumonia. Severe toxic symptoms may develop in which cough, cyanosis, irregular and persistent fever, loss of weight, anemia, prostration and rapid pulse predominate. Hemoptysis may occur. Physical findings of extensive dullness, tubular breathing and rales are readily obtainable over the involved area. Sputum, obtained by gagging or stomach washings, contains tubercle bacilli in large numbers. For many weeks or months there may be grave doubt as to whether one is dealing with a lesion which will eventually resolve and calcify, or one which will progress and result in death.

Ulceration of a cavity or a caseous lymph node into a bronchus with aspiration of large numbers of tubercle bacilli into the lung results in acute tuberculous pneumonia.

Tuberculous pneumonia, unlike primary pulmonary infiltrations, tends to progress, to spread, to cavitate, and to be attended by grave symptoms of illness. At first the disease may be unilateral, but as a rule the other lung before long becomes involved through transbronchial spread. The onset of the symptoms may be acute, simulating non-tuberculous pneumonia, or it may be more gradual. In either case the picture shortly is one of severe prostration with fever, cough, dyspnea, cyanosis, and rapid failure predominating. Hemorrhage may occur as the result of rupture of a blood vessel into a cavity. Physical findings are usually positive, resembling those of ordinary pneumonias with the possible exception that they may not be as extensive as one would expect from the roentgenographic picture. The disease is to be differentiated chiefly from the acute pneumonias, and from large primary pulmonary infiltrations. In respect to the latter, one may be in doubt sometimes, but the X-ray evidence of spreading lesions, particularly when they appear in the opposite lung, usually serves to make the distinction. Collapse therapy may be indicated in this form of tuberculosis.

Progress from the primary lesions by way of the lympho-hematogenous route is of considerable significance. During the pre- and post-allergic period, tubercle bacilli may reach the general circulation in dosages of varying degrees. Transported by the blood, the bacilli may cause single or multiple lesions in the lungs, meninges, bones, kidneys, skin and other organs. If the dosage is not too great, such foci usually become encapsulated and remain quiescent, but always as potential sources of clinical disease at some future time. When overwhelming invasion of the circulation occurs, as from rupture of a caseous node directly into a large blood vessel, the result is miliary tuberculosis, generalized or pulmonary; a complication few children survive. Until recently, the pathogenesis of tuberculous meningitis was generally regarded as being similar to that of miliary tuberculosis in that tubercle bacilli were carried directly to the meninges via the blood stream from a focus in the tracheobronchial lymph nodes. Rich and McCordock, however, have presented convincing evidence that this is not the case. Miliary tuberculosis apparently sets up caseous foci in the substance of the brain, cord, meninges, choroid plexus, or in the bones encasing the central nervous system. It is the rupture of one or more of these older caseous foci, permitting the discharge of bacilli directly into the cerebrospinal fluid which originates diffuse tuberculous meningitis. This view is supported by the fact that generalized miliary tuberculosis and diffuse tuberculous meningitis occur independently. Furthermore, the experimental injection of large numbers of virulent tubercle bacilli into the carotid artery produces occasional sparsely located meningeal tubercles rather than diffuse tuberculous meningitis.

It is probable that from 10 to 25 per cent of all children who acquire a primary tuberculous infection subsequently develop reinfection tuberculosis of the chronic pulmonary type. Only rarely does it develop in children before the tenth year of life, but it appears with increasing frequency during adolescence and reaches its maximum incidence between 18 and 30-35 years.

The time interval elapsing between the initial phase of the primary infection and the first development of the reinfection pulmonary disease may be many months or years, or the interval may be so brief that one appears to be practically continuous with the other. The former is likely to be the situation when the primary infection occurs sometime during childhood before puberty, while the latter more often obtains when the primary infection takes place in adolescence or in young adult life. No certain explanation exists for the unusual freedom which children between the ages of infancy and adolescence seem to enjoy from phthisical forms of tuberculosis. It has been suggested that it is due to the long period of time necessary for tuberculosis to develop into clinical disease in the human body, and that a similar course occurs in the young of animals and fowl. Also, it is likely that the increased need for minerals and proteins and other metabolic changes which occur in adolescence in association with the establishment of menses, as reported by Johnson, have a significant bearing upon the development of tuberculosis in puberty and upon its more frequent occurrence in adolescent girls.

The tubercle bacilli responsible for pulmonary tuberculosis may originate from exogenous or endogenous sources. Possible endogenous sources are the lesions of the primary complex from which bacilli may escape, or a pulmonary lesion laid down during the pre- or post-allergic lympho-hematogenous spread may light up. Whatever the source, the earliest lesions consist of small areas of lobular pneumonia, usually from one to three centimeters in diameter, which in the X-ray film appear as soft mottled shadows most frequently located in the subapical region. Usually a single focus, most often in the right lung, occurs, but multiple foci may be present. The ultimate fate of these early infiltrates may be in doubt for several months or even years. Some retrogress and heal by fibrous encapsulation, resorption or occasionally by calcification. Others undergo a slow process of progerssion by contiguity, central caseation, liquefaction and cavity formation.

Diagnosis of chronic pulmonary tuberculosis in its earliest incipient stages can be made only by X-ray. It is important, therefore, that tuberculin sensitive children should have annual X-ray films made of the lung from the age of puberty on. The detection of the characteristic soft mottled apical shadow of the early infiltrate calls for a most careful period of observation. Once the tuberculous nature of the lesion has become established and evidence of progression obtained, specific treatment is indicated. In the majority of cases, this will take the form of some type of collapse therapy.

DIAGNOSIS OF TUBERCULOSIS IN CHILDREN

Diagnostic tuberculin and the X-ray constitute the bulwarks upon which chief dependence is placed for the diagnosis of the various forms of tuberculous disease occurring in childhood.

History of exposure, symptoms of illness and physical findings are relatively poor diagnostic guide posts. Among those who are known to have been exposed to an open case of tuberculosis, it may be expected that the proportion found to be infected will be much greater than where no such history is obtained. On the other hand, active tuberculosis in a communicable stage is not infrequently present in some adult member of the family, or close associate of the child, entirely unsuspected. Unfortunately, the symptomatology of tuberculosis is not pathognomonic with the possible exception of the advanced stages of some of the reinfection forms. The transitory fever which accompanies the acute phase of some primary infections is easily overlooked or, if it is noted, ascribed to nonspecific infections of the respiratory tract. A similar situation exists with respect to physical findings.

Nevertheless, a careful physical examination is not to be neglected since it may be of great importance in the differential consideration of non-tuberculous disease. In this respect one should remember that positive physical findings obtained over the lungs, such as rales and changes in breath sounds in the percussion note are, in the vast majority of instances, due to conditions other than tuberculosis. Underewight, poorly nourished children are no more susceptible to tuberculous infections than are their robust associates. While children who are known to have been exposed to open cases of tuberculosis and those who present symptoms or physical signs of illness form an obvious group in which investigation for tubercuolsis is clearly indicated, nevertheless, restriction of case finding, even in private practice, to such children will inevitably result in failure to discover the major portion of infected children. The routine use of diagnostic tuberculin for children of all ages with retesting of the negative reactors at least every three years is a practicable program.

For determining the location and extent, and for following the course of tuberculous lesions, the X-ray or fluoroscope is indispensable. In general, the child who is discovered to react positively to tuberculin should have at least one film of his chest at that time. Experience has shown that further X-ray study may, in the vast majority of instances, safely be postponed until the tenth year of life.

Demonstration of tubercle bacilli is desirable whenever possible since it clinches a previously suspected diagnosis. Because of the habit most young children have of swallowing their sputum, the usual method of sputum examination as employed in older children and in adults is successful only occasionally when sputum can be obtained by gagging on a swab or on the end of a tongue blade. However, it has been shown that tubercle bacilli may be recovered from the stomach contents or in the feces of a fair proportion of children with primary intrathoracic tubercuolsis. As might be expected, positive results are most frequently obtained in the younger patients. Within six to eight months after the initial primary infection there is a marked tendency for the stomach contents to become negative, indicating that this is the length of time required for closing of the primary foci. What public health liability there is from children with primary infections would seem to be largely confined to this relatively brief period during which the lesions are in a "fresh" stage.

The technic of obtaining gastric contents for examination consists in washing the stomach with two to three hundred cubic centimeters of sterile water in the morning after a fast of six hours. The material is centrifuged, the sediment homogenized and a stained smear is examined. If negative, cultures are made and animal inoculation carried out. Similarly, material obtained from other suspected sources such as pleural effusion, ascitic fluid, cerebrospinal fluid and cold abscesses should be examined.

Studies of the blood, including the hemogram, sedimentation rate and Schilling differential count, are of less value in the diagnosis of tuberculous infections in children than in estimating prognosis and the favorable or unfavorable course of the disease. It is important to keep in mind the variations which normally occur in different age periods between lymphocytes, monocytes and leukocytes. No significant changes are noted in the total leukocyte count or in the differential smear in any of the stages of primary tuberculosis, including the acute inflammatory stage. In cases of reinfection tuberculosis an increase in the total leukocyte count is suggestive of secondary infection; a relative increase of monocytes over lymphocytes (M.-L. ratio) is indicative of activity and progression of the tuberculous disease; the reverse of these relationships occurs with resolution and healing; and a shift to the left in the Schilling count is evidence of increased toxicity, the greater the shift the more serious the prognosis. Likewise, repeated determinations of the sedimentation rate of the red cells may be useful in estimating the activity of the tuberculous process and in following its course.

Prognosis

The immediate prognosis of all primary tuberculous infections is good with the exception of infections occurring during the first five years of life, particularly during the first two years. In this age period, the prognosis is considerably worse for colored children than for white children. Approximately 90 per cent of white children infected during the first five years of life may be expected to survive their tuberculous infection. Such mortality as there is from tuberculosis will occur largely in the first two years of life and will occur in the group whose chest roentgenograms show parenchymal lesions. The risk to life is nearly twice as great in infants who acquire their tuberculous infection in the first year of life as in those who do not become infected until the second year. Death is due almost exclusively to the acute reinfection forms of tuberculosis such as meningitis, miliary disease and tuberculous pneumonia which result from the extension of the disease beyond the confines of the primary complex.

The remote prognosis for children who have acquired primary infections during childhood is uncertain. An unknown number (perhaps from 10 to 20 per cent of those who enter puberty with positive tuberculin reactions) will fall ill with chronic reinfection pulmonary tuberculosis sometime during adolescence or early adult life. Of this number, at least one-fourth will die of their tuberculous disease within the next six years. Whether institution of collapse therapy in the pre-symptomatic minimal stage will greatly alter this poor prognostic outlook in the future remains to be seen. It is very probable that it will.

Prevention

The hope of complete eradication of tuberculosis from the human race seems to rest squarely on the basis of its control by epidemiological means. Already great progress has been made in this direction. Bovine infections have been practically eliminated as a source of danger to infants and children. Protection of children from human infections is, of course, a far more difficult task, but the means are at hand awaiting application only to accomplish it. If a leaf could be borrowed from the methods employed by the veterinarians, the entire population of the nation would periodically be tested by tuberculin, the positive reactors would be X-rayed and studied for clinical disease, and those found to be contagious would be isolated and treated. While such an ideal program has little chance of immediate attainment, it can and is being approached. It is entirely practicable for physicians to provide their child patients with an immediate environment which is safe from the risks of tuberculous infection. A chest roentgenogram or a tuberculin test should be as routine in the prenatal care of every woman as is the taking of a blood specimen for syphilis. A similar examination should be made of the members of the family, including domestic workers, of school teachers, and of physicians, nurses and other personnel of hospitals caring for children. Repetition of these precautionary measures every two or three years, together with testing of the children themselves with tuberculin at like intervals, constitutes the most effective prophylactic program for children available at the present time.

Further protection for the children of America is being secured by mass X-raying surveys of apparently healthy groups in industry, rural areas, high schools, colleges and other groups. These programs are usually carried on without preliminary tuberculin testing and have as their aim the detection of active or potentially active tuberculous lesions. Miniature films and rapid film taking methods make it possible to examine large numbers of persons quickly and economically.

Unfortunately, no specific form of drug or serum therapy has been developed for tuberculosis. The sulfonamide chemicals apparently are not effective against the tubercle bacillus. Streptomycin is still in the experimental stage. However, it offers the most promise of any of the newer chemicals so far brought forward.

Rest, diet, healthful living conditions, and time are the general measures to be depended upon for bringing about healing in most of the tuberculous lesions. The importance of breaking contact with sources of infection as the first step in any form of tuberculous disease in a child cannot be overemphasized. The great majority of primary infections need no further treatment than this, plus rest and a well balanced diet for a few months when the lesions are discovered in the acute stage. Sanatorium or preventorium care is unnecessary, although the educational value of such institutions cannot be denied. Their facilities and those of convalescent or foster homes should, however, be utilized when contact with infection cannot be broken in the child's own home. Every precaution should be taken, too, to avoid exposing children with active tuberculous lesions to the acute communicable diseases, including colds and influenza. Ascorbic acid requirements are considerably increased in tuberculosis; hence liberal amounts of this vitamin should be included in the diet. Resumption of normal activities should be gradual, and presaged upon the serial X-ray appearance of lesions, the absence of symptoms, the sedimentation rate and an optimum state of nutrition.

Heliotherapy is indicated in all forms of tuberculosis except active intrathoracic lesions. Exposures should be gradual and should be interdicted if an incresae in fever and pulse rate is noted. Sunlight is preferable to artificial sources of ultraviolet rays. Cold or fresh air on open porches has been abandoned in favor of controlled ventilation and moisture content. The field of usefulness of collapse therapy in children is almost entirely confined to the treatment of chronic reinfection pulmonary tuberculosis in puberty and adolescence. However, it may have to be considered occasionally in younger children when cavities or hemorrhages occur in connection with the lesions of massive primary pulmonary tuberculosis or tuberculous pneumonia.

VARIATION IN STRENGTH OF TUBERCULIN

It is a well-known fact that two batches of tuberculin may differ in strength even if prepared in exactly the same manner—by the same man in the same laboratory, using the same strain of tubercle bacilli, the same culture medium, the same time for incubation, and the same method for preparation. The strength of the tuberculin prepared in different laboratories using different strains of tubercle bacilli, culture media, etc., will often vary considerably. This applies not only to old tuberculin (OT) but to purified tuberculin (PT) as well.

For the practical use of tuberculin in tests on man, it is of great importance to know fairly exactly the strength of the tuberculin employed, that is, the strength of the tuberculin in comparison with a recognized standard. Only when the strength of the tuberculin is known can the tuberculin test be used safely. When it is stated, for instance, that a dose of 0.0001 mg. PPD-S can be used without giving too many inconveniencing reactions, this holds true only for the particular batch of PPD-S tested. Another batch of PPD-S might be so strong that a dose of 0.0001 mg. would be too large.

The results of different tuberculin surveys can be compared only if the same dose of tuberculin of the same strength has been used or, within limits, if the comparative strength of the tuberculin employed is known. One of the reasons that tuberculin tests have been considered unreliable, especially for use in mass surveys, is that there has been too little attention paid to the facts that tuberculin may differ widely in strength and that the standardization most commonly employed has often been unsatisfactory. In using tuberculins that vary in strength, even if the doses are equal, almost any percentage of reactors can be obtained among the same population groups.—From *Standardization of Tuberculin,* by J. Holm and P. Lind, in *Public Health Reports,* February 7, 1947.

Fifteen Years of Tuberculosis Control at the University of Pennsylvania

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Since the organization of the Student Health Service at the University of Pennsylvania in 1931, a continuous program of tuberculosis control has been conducted among our students. Normal enrollment of full time students is approximately 6,000. During the 15 year period under review in this report, covering the academic years 1931-32 through 1945-46, our case finding activities have been directed along the following lines:

Entering Students: Tuberculin tests are applied routinely to all entering men students at the time of the required entrance physical examination. All reactors have chest X-rays within approximately two weeks of the time of enrollment. Entering women students are X-rayed without preliminary tuberculin testing. *Upper Classmen*: Annual chest X-rays are available to all students on a voluntary basis. *Medical Students*: Tuberculin tests and chest X-rays are required of all students at the beginning of the first year. Non-reactors are retested twice during each school year and chest X-rays are provided annually for all reactors. *Athletes*: Members of varsity teams engaged in intercollegiate athletics are required to have annual chest X-rays. *School of Education*: All members of the senior class are required to have chest X-rays just prior to graduation.

The entire cost of the tuberculosis program is financed by the student health fee which is five dollars a semester. Approximately 40 to 45 per cent of our students receive chest roentgenograms each year at a total cost of about three thousand dollars. This represents 5 per cent of the department's annual budget and, we believe, is an entirely reasonable expenditure in view of the significance of the tuberculosis problem among young adults of college age. Although the program outlined above assures quite adequate protection for certain large segments of our student body, a considerable proportion of upper class students do not report in for follow-up studies each year as we urge them to do.

The Tuberculosis Committee of the American Student Health Association has reported each year since 1932 on the tuberculosis activities of a large number of colleges and universities located in all sections of the United States. These reports reflect the very excellent progress that has been made in bringing this disease under control during the past fifteen years. In 1931 the tuberculosis death rate in this country was 67.8, whereas in 1944 it had reached an all time low of 40.8. This represents a decrease of 39.8 per cent during a thirteen year period.

Tuberculous infection, as measured by the tuberculin skin test, was reported in 35.0 per cent of students tested at seven colleges in the school year 1932-33. The incidence of infection has shown a steady and significant decline since that time. In 1942-43, among 42,107 students tested at 51 institutions, where at least an intermediate dose of tuberculin was employed, 18.6 per cent gave positive reactions. In that year thirteen colleges reported that less than 10 per cent of their students were reactors.

At the University of Pennsylvania 48 per cent of the students entering in 1931 were positive to tuberculin, whereas the entering class in 1946 showed but 28 per cent to be reactors. This is especially significant in view of the fact that the average age of students making up this year's entering class is considerably above that of students entering fifteen years ago. This is accounted for by the large number of veterans who are now enrolling in our colleges, many of them having been in service for a period of from one to four years. The incidence of tuberculous infection in this group has been somewhat lower than we had anticipated. Although our experience in this connection has been based on a relatively small number of veterans, approximately 4,000, it would appear that men in various branches of the service were, as a group, not unduly exposed to tuberculous infection. The picture might well have been quite different had routine chest X-rays been omitted from the medical examination at the time of induction.

During the past fifteen years a total of 177 students at the University of Pennsylvania has been found to have pulmonary tuberculosis. Of this number, 91 cases of the disease were among medical students and 86 cases were distributed among the students of all other schools. Since medical students comprised but 9 per cent of our total enrollment during this period, it is readily apparent that tuberculosis presents a special problem to students of medicine. Our experience in this respect has been quite similar to that reported by other universities.

Among students on the undergraduate level, with an average age of approximately twenty years, reports from a large number of colleges over a period of years indicate the prevalence of pulmonary tuberculosis to be approximately 2 to 3 cases per thousand. At the University of Pennsylvania we have found approximately 5.7 cases of tuberculosis per thousand students exclusive of those in medical school. This rate applies to the entire non-medical group, including those in the undergraduate schools as well as students of law, dentistry and veterinary medicine. Of the 86 students presenting pulmonary lesions, 82.9 per cent were classified as incipient or minimal, 13.8 per cent were moderately advanced and 3.3 per cent were far advanced. There have been three known deaths among this group.

The value of tuberculosis case finding has been amply demonstrated by our experience at the University of

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Pennsylvania. Early diagnosis is of utmost importance if we are to prevent prolonged disability as well as unnecessary deaths. Only 6 of the 86 students found to have tuberculosis have failed to complete their education on our campus. This was made possible only through the very excellent and intelligent cooperation which we meet with so consistently in dealing with students. The majority of this group presented pulmonary lesions which were unstable. In all such cases leave of absence is recommended and adequate treatment advised. The report of the Tuberculosis Committee of the American Student Health Association for the academic year 1941-42 shows that 744 new student cases of tuberculosis were discovered at 311 colleges and universities which provided case finding programs. During that year 319 students resumed their college work having undergone treatment for tuberculosis previously discovered. This is indeed convincing evidence of what is being accomplished through early diagnosis and prompt treatment of tuberculosis in college students.

Due to recent technical advances in the X-ray field the cost of surveying a student group has been reduced to a very moderate level. With the incidence of tuberculous infection among students being below 30 per cent in most communities, it is of course a distinct economy to use the tuberculin test as a screening method and thus identify those who are infected with tubercle bacilli. Where tuberculin is applied by the Mantoux method employing either P.P.D. or Old Tuberculin from a reliable source, it is quite well established that very rarely indeed will a person with significant tuberculous disease fail to react to the test. Furcolow, Hewell, Nelson and Palmer[1] report that in a series of over 500 cases of tuberculosis, in which they employed graded doses of P.P.D., more than 99 per cent reacted to the relatively small dose of 0.0001 mg. This is but five times the concentration of the usual first testing dose. They found none of the patients with active tuberculosis to be anergic to tuberculin. A college is therefore justified in limiting chest X-rays to the reactors among their students if costs are an essential consideration. An adequate program of tuberculosis control is therefore available to most colleges, through use of the tuberculin test and X-ray of all reactors, at a cost which should not exceed three hundred and fifty dollars per thousand students.

TUBERCULOSIS IN MEDICAL STUDENTS

The problem of tuberculosis in medical students has been rather carefully studied at a number of medical schools both in this country and abroad. Soper and Amberson [2] presented a very complete review of the subject in 1939. The earlier reports in the literature provided quite conclusive evidence that the incidence of tuberculosis in medical students is appreciably higher than in various other groups of comparable age. More recently, investigators have attempted to identify those phases of medical training which may be attended by definite risks of infection and to institute adequate control measures against all possible sources of infection. Several medical schools have succeeded in this manner in reducing very substantially the attack rates of both tuberculous infection and disease.

During the past fifteen years 91 medical students at the University of Pennsylvania have been found to have pulmonary tuberculosis among a total of approximately 2,300 students observed during this period. Ten students entered with lesions, thus 81 developed tuberculosis during their medical school training. In 90.1 per cent of students the disease was minimal, in 8.8 per cent it was moderately advanced and in 1.1 per cent it was far advanced. In addition to those presenting parenchymal lesions, there were five students who developed serofibrinous pleurisy. In all five of these students the effusion appeared five to seven months after the date of primary infection.

The year of medical training in which tuberculous lesions have been detected in our students has followed much the same pattern as reported by other schools. The senior year has accounted for 38.6 per cent of cases, the junior year 49.1 per cent and 12.3 per cent have been found among second year students. The prevalence of tuberculous infection among students entering medical school has shown a decrease in recent years similar to that observed in academic freshmen. In the class entering in 1935 there were 66 per cent reactors to tuberculin, in 1939 there were 59.4 per cent and in the 1946 class 45.0 per cent. Morris [3] reports 58 per cent of students as reactors in the entering class of 1932 and 26 per cent reactors in 1940.

In studying the epidemiology of tuberculosis in medical students, nurses and similar groups, the tuberculin test has proved to be of utmost value. If applied at sufficiently frequent intervals the approximate time of primary infection may be quite definitely established. High infection rates during certain limited periods of training are indicative of an environment which provides ample opportunity for infection. Various reports on the incidence of tuberculous infection in medical students and nurses indicate almost without exception a rate of increase from year to year which is well above that of the general population. Boynton [4] compared the incidence of infection in students in the college of education, student nurses on a general hospital service and student nurses on a special tuberculosis service. The infection rate was 100 times as great in those on a general hospital service as in college of education students and 500 times greater among those on a tuberculosis service. In the large general hospitals of our eastern cities a very high percentage of nonreactors among nurses acquired infection during training. Israel, Hetherington and Ord [5] report on their observation of 637 student nurses followed through three years of training at the Philadelphia General Hospital. Of 277 nonreactors on admission to training, 48 per cent became reactors during the first four months. By the end of the third year all of the originally negative group had become positive. Sixty-eight nurses or 10.6 per cent developed tuberculosis. At Bellevue Hospital in New York, Riggins and Amberson [6] found that close to 90 per cent of nonreactors among nurses converted during their three years of training. Up until quite recently there were but two or three members of each of our graduating classes in medicine who remained negative to tuberculin. In 1945-46 however, the picture was as follows: Fourth year, 70 per cent reactors; third year, 64.4 per cent; second year, 55.8 per cent, and first year 43.6 per cent.

During the past ten years the annual attack rate of pulmonary tuberculosis among our medical students has varied between 2.1 per cent and 0.38 per cent. The higher rate is based on 11 new cases discovered in 1938-39, while the lower rate prevailed in each of the last two years, with two new cases in each year. During this ten year period 57 students developed tuberculosis among 1,700 students under observation, an incidence of 3.3 per cent. The last six years, however, have witnessed considerable improvement, the incidence during this period being 1.8 per cent. The lowered rates of infection and disease during the past few years have followed the adoption of various measures planned by a faculty committee after careful study of the problem over a period of years.

The various clinical and laboratory courses which have been considered at various schools as potential sources of infection to students are the following: Medical clinics, where known, open cases of tuberculosis are used for clinical teaching; physical diagnosis classes, employing advanced cases of tuberculosis for the demonstration of abnormal physical signs; the pathology laboratory, in the demonstraiton of gross specimens and the autopsy room with repeated attendance at necropsies on tuberculous subjects; the bacteriology laboratory, if work with virulent tubercle bacilli is required. There are also, of course, casual contact exposures which may be encountered during the clinical years through examination of undiagnosed cases of tuberculosis on various ward services and in the out-patient departments. At Pennsylvania we have attempted to reduce by every possible means the exposure of students to known sources of infection. It was observed that new lesions were detected in third year students more frequently than in other classes. And since many of these were discovered during the first few weeks of the school year, it seemed obvious that if the disease were due to superinfection from exogenous sources, such infection had probably occurred some months previously. Activities in the second year of medicine which provided possible contacts with tubercle bacilli were chiefly the courses in physical diagnosis and in pathology. In the former it was not unusual for students to spend repeated and prolonged sessions in the examination of patients with advanced tuberculosis. This practice has been discontinued. The department of pathology now uses only fixed specimens for laboratory demonstrations. Autopsy room technique was given careful consideration and several changes made for the protection of students. These included more adequate facilities for the washing of hands and the immediate discarding of gloves, gowns and aprons which were sterilized before use.

Hedvall,[7] of Lund University, observed the frequency with which primary infection in medical students coincided with the course in general pathology. Thorough and repeated examinations of autopsy rooms were made for the presence of tubercle bacilli. He reports that, "in spite of all precautions as regards cleanliness during the post-mortem examination, tubercle bacilli were discovered in the rooms and on different objects when an examination was made twenty-four hours after a necropsy examination of a person with tuberculosis." More stringent precautions for disinfecting autopsy rooms were taken and the number of autopsies attended by students was greatly reduced. Following the adoption of this plan they found that for the first time in their experience "all students who were non-reactors at the beginning of the course were also negative at the conclusion of the course." This observation, however, covered only two classes which completed the course under the new plan of reduced exposure.

Meade[8] of the University of Rochester Medical School recently reported a very thorough study of this problem and a program for its correction which has proved to be highly effective. Before instituting a case finding program in 1937, the known annual incidence of tuberculosis among their students was 0.9 per cent. By October 1941 their program provided for routine chest X-rays three times during the school year and in March 1943 tuberculin testing and chest X-rays were stepped up to four times a year. The average annual incidence of disease for the period 1937-42 was found to be 3.2 per cent, with a high of 5.0 per cent being reached in the school year 1939-40. Their investigation of probable sources of infection revealed that over a period of years an average of 52 per cent of students were reactors to tuberculin at the beginning of the second year whereas 91 per cent were reactors at the completion of the year. Thus 81 per cent of non-reactors acquired primary infection during the second year of the medical course. The only courses offered during this period in which students had known contact with tubercle bacilli were bacteriology and pathology. They felt that the former offered little, if any, degree of risk. With the cooperation of the department of pathology it was therefore agreed upon to eliminate all contacts with tuberculous materials in autopsy rooms and laboratories during a trial period. This program provided that no student would participate in known tuberculous autopsies; that students were to be dismissed from participation as soon as unsuspected tuberculosis was found at autopsy and no tuberculous materials were to be handled by them. Following the adoption of this policy most striking reductions were observed in both infection rates and the incidence of tuberculous disease. Students completed the first two medical years with only 8 per cent of non-reactors now becoming positive. There have been no cases of tuberculosis among the students of two classes which have been followed through to graduation subsequent to the revision of practices in the pathology course.

Meade's experience relating to the development of tuberculous disease among students entering medical school as non-reactors is of special interest. Among 138 students who were reactors at entrance, there were four, 2.89 per cent, who developed tuberculosis before graduation. Of 175 students negative on entry who became positive during training, there were 27 cases of tuberculosis, 15.4 per cent of the group. In this series of cases the average interval between the first known positive test and the detection of a pulmonary lesion was 7.6 months. This experience is in keeping with that of numerous other investigators.

Morris,[8] reporting on the observation of 449 women medical students over a period of twelve years, sums up her experience as follows: "An infection rate of 100 per cent, X-ray evidence in 16.7 per cent, a clinical morbidity rate of 12.5 per cent, a case fatality rate of 10.7 per cent and a mortality rate of 1.3 per cent developing in a stronghold of medicine with facilities readily available certainly constitutes a challenge of sufficient magnitude to interest the entire medical profession in a survey of conditions in other medical educational institutions and hospitals." Morris observed the time relation of tuberculin conversion and the subsequent development of pulmonary lesions in a group of 38 students. In 22 of these there was X-ray evidence of disease within six months of the conversion date and in 12 others the interval was under one year. Israel[5] and his co-workers report that 12.3 per cent of nurses who were non-reactors at the beginning of training developed tuberculosis as compared with 9.4 per cent developing lesions among those originally reactors. They call attention, also, to the earlier development of disease among non-reactors. They state: "The time of occurrence of tuberculosis differed distinctly in students tuberculin negative on admission and those who were tuberculin positive. In the former group the lesions developed considerably earlier and the attack rate fell off sharply during the third year. Among students reacting to tuberculin on admission the attack rate rose very slowly and reached its maximum in the third year of training." Zacks and Sartwell[9] studied the inmates of an institution for the feebleminded and found a higher incidence of tuberculosis among non-reactors. This they attributed to conditions which favored heavy exposure, as indicated by high infection rates. Their comment on this phase of the problem is as follows: "One may expect that, in persons whose environmental contact with tubercuolsis is heavy and continuous, most of the cases will develop among non-reactors." Similar findings are reported by Heimbeck and others in numerous publications from Oslo, Norway, dealing with medical students and nurses who have spent considerable periods of training on various tuberculosis services. The foregoing reports seem, therefore, to present a rather definite pattern. This may be summed up as follows: An environment which provides for repeated, and at times, heavy dosage of infection with tubercle bacilli invariably contributes to high infection rates among young adults. If such exposure extends over a considerable period of time, reinfection may follow closely upon a primary infection which has produced a high degree of hypersensitivity to tuberculoprotein. Under these conditions, pulmonary lesions of the reinfection type frequently develop within relatively short periods following primary infection. The size of the dose of tubercle bacilli undoubtedly plays a major role in the production of such a picture. This is emphasized by Rich and McCordock.[10] Commenting on the role of immunity and allergy in tuberculosis they say: "Tubercle bacilli introduced into the body of an infected animal appear to be held locally, i. e., to spread less rapidly from the site at which they first lodge and furthermore, they are undoubtedly less able to survive than they are in the tissues of a normal animal. The infected body becomes changed in some manner which renders the bland protein of the tubercle bacillus capable of acting upon the tissues as a powerful irritant or poison. As a result of the change, the cells of the allergic body are more extensively damaged and killed by a given amount of tuberculoprotein than are the cells of the normal body. More extensive damage and death of cells and more extensive, acute inflammation, constitute therefore, the local, visible expression of the action of allergy."

In our observation of medical students during the past fifteen years the early appearance of parenchymal lesions following primary infection has been encountered but rarely. The shortest interval that we have observed between primary infection and the development of a reinfection type lesion is approximately eight and one half months. Four students developed pulmonary lesions which we considered to be of the primary infection type. These were small, sharply delimited areas of a nodular type of density which made their appearance at about six to eight months after the development of sensitivity to tuberculin. In our experience, these have a tendency to persist over long periods of time and do not clear as readily as the exudative type lesion of reinfection. Since there is danger of breakdown and spread from these primary pulmonary foci they should be kept under closest scrutiny including frequent chest roentgenograms. The picture presented by primary tuberculous infection in adults differs in several important respects from that so frequently seen in infants and children. Pulmonary involvement is apparently much less frequent in the adult, the parenchymal lesion is more frequently localized in the upper portions of the lung and is practically never encountered as the massive, pneumonic type of process so characteristic in early childhood. Moreover, the tracheobronchial lymph nodes rarely show perceptible enlargement. We have followed several hundred students for periods up to several years following primary infection, with chest films at rather frequent intervals, and we have never seen the pronounced hilar node enlargement proceeding on to calcification which is so common in the younger age groups.

The specificity of the tuberculin test has been well established although very few studies have been conducted with results that would indicate any real significance on a quantitative basis. However we have observed a small number of students in whom markedly increased sensitivity to tuberculin was followed in a few months by the development of significant pulmonary lesions. Some of our students are rather apprehensive about the dangers of contracting tuberculosis and come to us as often as every two or three months for retesting with tuberculin and chest X-rays. We have, therefore, had the opportunity to retest frequently students who were slightly sensitive only to the larger doses of tuberculin. The following case history is one of several such experiences which have been of particular interest. A student had normal chest X-rays in his first and second years. At the beginning of his third year he had two courses, one following the other, in which he stated there was definite contact with cases of tuberculosis. On October 5, 1936, he was negative to 0.01 mg. O. T. but gave a mildly positive reaction to 1.0 mg. O. T. on October 8. Chest X-ray on November 13 was again negative. On November 21 he requested another tuberculin test in view of his continuing exposure to tuberculosis. The 0.01 mg. O. T. now produced a strong, three plus reaction. He was advised to return for chest films at six weeks intervals which he failed to do. On April 6, 1937, chest X-ray revealed a left apical lesion with a central area suggestive of cavitation. He was put on strict bed rest at once and on April 27, 1937, tubercle bacilli were found in the sputum. We are now following rather closely a considerable number of students who react only to the larger dose of tuberculin. By frequent testing, we hope to determine what porportion of students may exhibit a marked increase in sensitivity, especially following known exposure to tuberculosis. Frequent X-rays of those showing this change should throw considerable light on its significance in the subsequent development of tuberculous disease.

Summary

Programs for the control of tuberculosis among college students are now being conducted at several hundred institutions. The incidence of tuberculous infection among entering students has shown a very significant decrease during the past fifteen years. In most sections of the United States less than 30 per cent of undergraduate students react to tuberculin and in many areas, less than 20 per cent.

During the past fifteen years a continuous program of tuberculosis case finding at the University of Pennsylvania has resulted in the detection of 177 students with pulmonary tuberculosis. Medical students and nurses frequently show surprisingly high rates of infection during their training, a condition which invariably gives rise to a high incidence of disease. The problem has been given careful study at a number of medical schools with the result that infections have been very materially reduced.

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Editorials

VERNAL PYREXIA

Every Spring there seems to be an alteration in the circulation throughout all nature with manifestation of mental perturbation, emotional fluctuation, intermittent procrastination and frequent nervous irritation. The resultant contemplation on a possible explanation may be the association of radiation, transfiguration and beautification of creation as the causation of this agitation. There is an inclination towards meditation in anticipation of floral cultivation and crop rotation, refrigeration and one's vacation. Investigation of patients with this post-hibernation revelation shows indication of modulation or even complete annihilation of any ambition motivation. Application to obligations and regulations produces loss of perspiration and therefore fails of recommendation. Other manifestations include: a lack of appreciation for civilization, and instead, an inclination towards perambulation, migration, navigation or aviation. The habitations of relations in far-away locations take on a strange fascination. The medical profession show a lack of interest in diagnostic observations, local applications, immunizations, cauterizations, operations, office consultations and professional visitations.

Psychologically speaking, romantic imagination turns toward trivial communication, flirtation and closer association. Women's affectation, manifestation and ornamentation vie with men's incrementation of ostentation, adulation and ululation to promote mutual attraction. These creatures are quite normal and their innocent dissipations, vagrant speculations and hallucinations concerning the opposite sex lead the way to blissful marriage.

This is neither an oration nor a recitation but a mere indication of our disinclination to write a dissertation on anything more serious than vernal pyrexia.

A. E. H.

THE PHYSICIAN AND THE MINNEAPOLIS CHEST SURVEY

For more than fifteen years the April issue of the Journal-Lancet has been devoted to articles on diseases of the chest, with emphasis on tuberculosis. Most of the articles have been prepared on invitation by authors in other nations and throughout the United States. This has been an effort to bring to our readers the best thinking and methods of diagnosis, treatment and prevention of tuberculosis in use anywhere in the world. This has borne excellent fruit for there is now no part of the world where better tuberculosis work is being done by the medical profession than that which the Journal-Lancet serves. Throughout these areas the mortality, morbidity and infection attack rates of tuberculosis have tumbled down.

In 1920 the mortality rate from tuberculosis was 120 per 100,000 in Minneapolis. In 1942 it was only 24. Had the 1920 mortality rate prevailed or continued, we would now have about 600 deaths from tuberculosis annually, instead of approximately 125. In 1945 not a single child died from tuberculosis under the age of five years. The demand for sanatorium beds by residents of Minneapolis has so decreased that for the last few years between one hundred and two hundred of the county sanatorium beds have not been needed.

In 1926 almost one half of the grade school children had primary tuberculosis as manifested by the tuberculin reaction, whereas, in 1944 only 8 per cent, or one in twelve, had this form of tuberculosis. Among Minneapolis children up to the age of six years, the annual infection attack rate was approximately 3 per cent in 1926, but it was only one third of one per cent in 1944. In other words, of 100 infants born today, it is three years before one is infected.

Despite this almost unparalleled accomplishment, it is the belief of physicians that there are unsuspected cases of contagious tuberculosis in this city. It is this suspicion that occasioned the present chest survey. Family physicians are now besieged with questions from members of their clienteles as to the advisability of participating in the survey. These physicians have far more influence than many realize. Their advice will be accepted and passed on to thousands. Hence the success of the survey is in no small way dependent upon the family physicians.

The present survey can accomplish only one purpose, namely, to screen out from the persons who respond, those who have lesions large enough and dense enough to cast X-ray shadows visible to the naked eye. All such lesions represent gross pathology. When these individuals are screened from the population, it becomes the opportunity and the privilege of the physicians whom they themselves designate or choose, to determine the etiology of the disease casting the shadows and decide what treatment, if any, is indicated. It is the further privilege of the physicians to administer the treatment which they deem necessary or refer individuals to other physicians or institutions of their choice. Thus the responsibility for the diagnostic and therapeutic work is thrown into the laps of the physicians of Minneapolis. For this reason the Technical Committee of the Hennepin County Medical Society requested the Journal-Lancet to publish a special issue composed almost entirely of articles pertaining to the survey. Moreover, the members of this committee selected the subjects and chose the authors whom they desired to prepare the manuscripts. Therefore, most of the papers in this issue were prepared for the express purpose of presenting information and procedures of practical value to the physicians of the county who will be charged with the diagnosis and treatment of chest diseases brought to light through the survey.

A difficult problem with which the medical profession must cope as the survey proceeds is that of advising and informing those persons whose chest films are clear. Such individuals will probably constitute at least 98 per cent of all who report for X-ray inspection of their chests. Unless every effort is made to inform them properly, there is great danger that clear chest films will give them a false sense of security. Somehow they must be brought to understand that there is no finality whatsoever about a negative X-ray film of the chest. If the medical profession does not make certain that this is understood by the public, physicians will suffer a great deal of chagrin during the following months and years. Moreover, there is the danger that chest surveys will fall into disrepute in the public mind. For example, it has been announced that the survey constitutes a search for heart disease, malignancies, tuberculosis and other diseases of the lungs. In all probability there will be people who, within a day or certainly a few months after receiving negative X-ray report, will die from coronary thrombosis. Their relatives and friends will wonder why this condition was not found during the survey. There will be other persons who, within a brief time after receiving negative reports from the survey, will be found to have marked manifestations of bronchogenic carcinoma. Therefore, the public should know that bronchogenic carcinoma is not revealed by X-ray until gross pulmonary changes, such as atelectasis, develop.

While some persons will be found with gross pulmonary tuberculosis, there will be many more who have tuberculosis whose chest films are clear. Among these tuberculous persons with clear films are those whose lesions are certain to evolve to macroscopic proportions within weeks or months after the survey is over. These individuals are likely to blame the survey unless the possibility of such occurrences has previously been explained to them. At this point, Minneapolis physicians have the greatest opportunity of all time to explain to the public that an X-ray inspection of the chest is good only for the moment and that there may be considerable disease present at that very moment which is too small or is not sufficiently dense to cast X-ray shadows visible to the unaided human eye. The public must also know that at any subsequent time new disease can develop. Therefore, periodic, complete examinations, never limited to but always including X-ray inspection of the chest, should be recommended to every person following the survey.

J. A. M.

AMERICAN STUDENT HEALTH ASSN. NEWS

West Virginia Wesleyan, Buckhannon, West Virginia, has applied for membership in the American Student Health Association. Dr. A. A. Schoolcraft is Director of Student Health.

Nancy Whitticar, M.D., has been appointed College Physician at Mary Washington College, Fredericksburg, Virginia.

George M. Decherd, Jr., M.D., Director of the Student Health Service at the University of Texas, has conducted preliminary plans for a new clinic hospital for their health service.

Two new members have been added to the staff of Emory University, Emory University, Georgia. They are Dr. Joseph P. Melvin, graduate of Tulane University School of Medicine, and Dr. William S. Hooten, graduate of Duke University School of Medicine, both in 1943. Dr. Melvin has recently completed a year's work in Cardiology at University of Michigan. Dr. Hooten is being released from the U. S. Army after eighteen months service chiefly as Consultant in Medicine.

Dr. J. W. Armstrong, Director of the Health Service at Berea College, Berea, Kentucky, is in need of a physician and a surgeon to fill vacancies on his staff.

Preliminary Program, Annual Meeting, Montana State Medical Association, Florence Hotel, Missoula, Montana, June 26, 27, 28, 1947

The House of Delegates will meet each morning from 8:00 to 10:00 A.M. The scientific discussions will begin at 10:00 A.M. and 2:00 P.M. each day. The speakers for the scientific discussions are professors from the University of Oregon Medical School and are listed below, together with their subjects:

Carl George Heller, Ph.D., M.D.: "Use of Testosterone in the Male," "Use of Anti-thyroid Drugs Including Thiouracil and Propyl Thiouracil."

John H. Benward, M.D.: "Staphylococcic Pneumonia," "Acute Bronchiolitis in Children."

Howard P. Lewis, M.D.: "The Recognition and Management of Chronic Hepatitis," "Present Concepts of the Cause and Treatment of Arterial Hypertension."

Gilbert McKelvey, M.D.: "Present Day Treatment of Osteomyelitis," "Internal Derangement of the Knee."

Dean Seabrook, M.D.: "Carcinoma of the Mouth and Face," "Surgical Treatment of Peptic Ulcer."

Howard Cecil Stearns, M.D.: "Recognition and Treatment of Female Genital Carcinoma," "Treatment of Uterine Prolapsus with Emphasis on Selection of Operative Procedure."

In addition, each speaker will conduct a panel discussion at the noon luncheons as follows:

Dr. Heller: "Male Sterility."

Dr. Benward: "Specific Therapeutic Measures in Pediatrics."

Dr. Lewis: "Tuberculosis of the Major Serous Cavities."

Dr. McKelvey: "Treatment of the More Common Fractures."

Dr. Seabrook: "Carcinoma of the Breast."

Dr. Stearns: "Diagnosis and Management of Pelvic Endometriosis."

DEATHS

Dr. Francis E. Harrington, 67, died May 9 in West Palm Beach, Florida. He was city health commissioner in Minneapolis from 1920 to 1944 and superintendent of General hospital from 1937 to 1939 and from 1942 to 1944. The January 1947 issue of JOURNAL-LANCET was dedicated to Dr. Harrington.

Dr. William Davis, 93, general practitioner in St. Paul for 56 years, died May 9. Dr. Davis served as associate editor of *Northwestern Lancet,* forerunner of the present JOURNAL-LANCET, from 1886 to 1899.

Dr. Floyd L. Gilles, 54, staff physician of Fairview hospital, Minneapolis, died April 24. He had practiced in Minneapolis for 30 years and was a veteran of the Army Medical Corps in World War I.

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New Series

Carcinoma of the Colon*

W. A. Fansler, M.D.†
Minneapolis, Minnesota

The fundamental principles of diagnosis and treatment of carcinoma of the large bowel are well known to this group. With this in mind, rather than a textbook picture of this condition, I shall outline a general plan which we follow in these cases and interpolate certain ideas which we have in reference to the care of this disease.

Symptoms

In the majority of cases, the first symptom to be noted by the patient is that of bleeding. Bleeding is due to ulceration and/or traumatization of the lesion. This is first noted either as a severe or moderate hemorrhage or merely as traces of blood on, with, or in the stool. The type of blood is principally of academic interest. It is true that dark clotted or partially digested blood is often indicative of a lesion high in the intestinal tract while fresh blood indicates a lower lesion. Exceptions to this rule are so frequent that no great importance should be attached to the character of the blood. The important fact is that blood of any kind is present. Blood is the red flag which indicates "Stop, Look and Listen." Blood, then, is the most important symptom, though constant or recurrent diarrheal stools often occur in growths of the right half of the colon and obstructive symptoms occur in the small constricting growths in the distal portion of the colon. These must be kept in mind as the next two most important danger signals.

Obstructive symptoms are interpreted by the patient as abdominal cramps. These vary from slight transitory feelings of hyperperistalsis to definite recurring periods of intestinal cramping. In early partial obstruction, a short period of cramping followed by bowel movement and relief of symptoms is the rule. As obstruction becomes more marked, attacks of cramping recur at more frequent intervals and the cramps are unproductive—a fact in itself strongly suggesting a fairly high grade obstruction. Polypoid tumors not large enough to produce obstructive symptoms may cause a degree of recurrent intussusception of the bowel which also produces a colicky pain.

In approximately 20 per cent of cancers of the left colon, a complete or practically complete obstruction is the cause of the patient first consulting a physician. I believe this may be attributed to the common practice of self-medication with mineral oil. Mineral oil will cause finely digested food to pass through an unbelievably small opening without causing appreciable symptoms. The acute attack of obstruction is caused by the collection of a large amount of fecal matter above the area of constriction, its sudden plugging by some mass of undigested material and/or the rather sudden closing of the opening due to edema and inflammation about the orifice. At operation, however, the bowel wall above the constriction is usually found to be thickened and hypertrophied, indicating a chronic process.

Methods of Diagnosis

Once attention is called to the large bowel, presumptive diagnosis, at least, rests on proctoscopic and X-ray examination. Only in exceptional cases are other methods of examination the major factor in determining the diagnosis. Proctoscopic examination is necessary to eliminate the presence of rectal and occasionally lower sigmoid lesions. In rare instances it is possible to pass a proctoscope well into the sigmoid and even the descending colon. Its value in higher bowel lesions is the determination as to whether or not blood or mucus may be coming from somewhere above the point visualized by proctoscopic examination. This is an extremely valuable finding. With a normal bowel, as visualized by the proctoscope, the presence of fresh or clotted blood in small or large amounts is significant of some unseen lesion. Proctoscopic findings may be suggestive but X-ray is our only reliable method of locating the trouble, other than exploratory operation. Needless to say, the first X-ray examination of the colon should be done by barium enema and not the ingestion of barium by mouth. We have all had the trying experience of seeing a patient who has been given barium by mouth with his colon completely filled with rock-like barium above an obstructive lesion. Unfortunately, the same condition may occur following a too heroically given enema. Barium injected into the rectum under considerable pressure can be forced through a narrow constricted area, thus filling the bowel above, and often the colon is unable to force it back. Our X-ray consultants are asked never to use force in injecting barium, and, if a markedly constricted area is demonstrated by a thin trickle of barium passing through it, to discontinue further injection at once. We consider preoperative visualization of the entire colon less important than accepting the risk of having a colon distended with barium at the time of operation.

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*Presented at the Annual Meeting of the Philadelphia Proctologic Society, Philadelphia, Pennsylvania, January 15, 1947.

†Clinical Professor of Surgery, University of Minnesota Medical School.

Presumptive diagnosis is usually made on X-ray studies by demonstrating a tumor mass or finding an area of a distortion in the bowel wall and/or a constriction of its lumen, or both. These findings depend upon the type and extent of the tumor. The first type of tumor is the polypoid type which early possesses a definite pedicle or is attached to the mucosa by a narrow base. At this stage, the tumor appears as a rounded or irregular mass in the bowel lumen which is normal in contour. It is only later, after the tumor has grown to considerable size and the bowel wall has been invaded by tumor tissue via the pedicle that irregularity, puckering or distortion of the bowel lumen appears.

The second type is the flat button-like lesion. In the early stages these can seldom be demonstrated by X-ray. In most instances, by the time the tumor is 1.5 to 2 cm. in diameter, ulceration will have occurred in the center of the growth and invasion of the submucosa and perhaps the muscularis is present. At this time, and this is the earliest time, a slight puckering in the bowel wall may be demonstrated by careful X-ray studies. From this point the tumor may do one of two things: first, a considerable tumor mass may develop which shows as a shadow in the bowel lumen plus bowel wall deformity; second, the tumor may gradually extend around the bowel wall with the formation of no appreciable tumor mass, simply forming a tight constricting lesion—the so-called napkin-ring carcinoma. It is this type of lesion which often bleeds but little and the patient has no suspicion of trouble until partial or even complete obstruction occurs.

Small pedunculated lesions, which are usually less malignant, are quite easily demonstrated by colon aerograms. In general, we feel that any pedunculated lesion 1 cm. or larger in diameter should be shown by X-ray examination and frequently much smaller ones can be demonstrated. Without exception, where a small lesion is shown, we re-prepare our patient with a cathartic and repeat the examination. If, on second examination, a similar defect is found in the same location, we advise surgical interference. A small piece of stool or other artefact often simulates a polypoid growth but, if the shadow is due to this cause, it will have disappeared or at least markedly changed its position following a cathartic. In cases where X-ray examination is negative but blood can be demonstrated as coming from beyond the area of proctoscopic visualization, we advise repetition of the X-ray examination every three months for one year. If a small tumor is present, it should increase enough in size to be demonstrable sometime within that period.

In the case of small pedunculated lesions, no definite diagnosis as to their character can be made by X-ray. The majority, however, are benign or show a very low-grade malignancy. On the other hand, any lesion, however small, which produces a distortion of bowel wall contour is usually malignant.

Preoperative Preparation

The preoperative preparation of the patient is important. Fortunately, there is ample time for adequate preparation, except in those cases with acute obstruction. Many patients with high-grade but not complete obstruction, if given 4 to 6 ounces of mineral oil daily, will shortly begin to expel their retained stools and, with the judicious use of saline cathartics, completely evacuate their colon.

Acute obstruction is an emergency. If a flat plate of the abdomen shows the colon to be markedly distended with gas, an attempt is made to pass a leaded intestinal tube into the colon. If the tube cannot be passed into the colon, it at least can be passed into the small intestine. This will partially deflate the small bowel, rendering subsequent operation somewhat less difficult. Intravenous fluids and blood are given. If X-ray shows the colon to be markedly distended and suction does not greatly reduce the distension within a few hours, operation should not be delayed. Delay with a greatly dilated large bowel can and does cause cecal perforation through ischemia and necrosis of the bowel wall. On the other hand, if distension can be controlled by suction it is advisable to wait in hopes the obstruction may be relieved medically, and surgery be performed under better conditions. If surgery is necessary to relieve obstruction, we believe colostomy is preferable to cecostomy. Cecostomy will relieve distension due to gas, but adequate removal of fecal content is not possible through a cecostomy. If the growth is in the distal half of the colon, the colostomy is done in the transverse colon. The bowel loop is brought out over a glass rod and the gut incised proximal to the rod which helps prevent passage of stool into the distal segment. The distal loop of the bowel is later irrigated to remove the retained stool. Not infrequently, after the tension is relieved, the inflammation and edema in the bowel adjacent to the obstruction will subside and stool will be passed per rectum. We have entirely discontinued the Devine colostomy as an unnecessary and more complicated procedure. In the rarely occurring obstructive lesions in the proximal half of the large bowel, cecostomy is the only procedure available. Also, in lesions in this location, cecostomy is usually adequate to clear out retained intestinal content.

It is trite to say that careful preoperative preparation is essential. The acceptance of this principle is generally practiced. Aside from attention to specific organic impairments, it consists essentially of restoring fluid balance, correcting blood dyscrasias, and protein and vitamin deficiencies. The importance of this cannot be over-estimated in lowering mortality, promoting wound healing and encouraging a generally smooth and rapid convalescence. With present methods of intravenous therapy, rehabilitation can usually be accomplished with a few days of intensive effort.

In the average unobstructed case we allow five days for bowel preparation. This consists of a preliminary dose of 1 ounce of epsom salts, well diluted, followed by a very low residue, high protein, high vitamin diet. An 8-ounce saline enema is given each day. Sulfasuxadine, .25 gm. per kg. of body weight, is given as an initial dose and then the same amount given daily in four equally divided doses. We prefer sulfasuxadine to sulfathaladine because it produces a rather free action of the bowels while sulfathaladine does not. Using sulfathaladine, we frequently found considerable formed stool in the bowel at the time of operation and for that reason have discontinued its use. The evening before operation 50,000 units of penicillin are given and then continued at the rate of 100,000 units per day in divided doses.

In cases where mild obstruction is present, the patient is given 2 ounces of liquid petrolatum three times daily. In most instances, free bowel movement will result in two or three days, at which time salts are given by mouth and saline enemas by rectum. These patients require longer preparation but every effort is made to clear the bowel of stool before operation is done. In case of doubt, a flat plate of the abdomen will usually show whether or not any hardened fecal material remains.

We are accustomed to have our anesthetics given by trained physician-anesthetists. The anesthesia used is spinal, either pontocaine in glucose or nupercaine 1-1500. In addition, sufficient sodium pentothal is given to keep the patient lightly asleep. Curare is sometimes used to promote relaxation, or a small amount of oxygen is often given. While an anesthetic as administered by a non-medical anesthetist is usually adequate and satisfactory, we do feel that it is a great relief to the operating surgeon to be freed of the responsibility.

Operative Procedures

Except in cases of obstruction, we almost invariably complete our operative procedure in one operation. One of two operations are generally employed. In growths in the distal half of the colon, we do a resection with primary end-to-end anastomosis. In tumors of the right half of the colon, we do a resection of the entire right half of the bowel with an ileocolostomy placed somewhere in the transverse colon. At this point, I wish to say that for the past two years we have invariably done an open type of anastomosis. I realize this may not be in accord with the ideas of a great many surgeons, but I personally find it more satisfactory and over a two-year period we have not had a single case in which serious postoperative infection occurred. After observing the anterior anastomoses as done by Dr. Claude Dixon (an open method), and seeing the numerous instances of inadvertent gross contamination which occurred during so-called aseptic procedures, I have concluded that any advantages in doing an aseptic anastomosis were mostly in the mind of the operator. It is my belief that peritonitis does not result from contamination at the time of operation. Rather it comes from leakage which occurs in the vicinity of the anastomosis after the operation is completed. This leak is usually caused by one of three things: a leak at the suture line due to poorly done anastomosis; a slough at or near the suture line due to poor circulation; or the pressure of gas or stool against an anastomosis which is not patent. I can be much more certain of a leak-proof anastomosis, an adequate blood supply, and a widely patent opening by doing an open anastomosis than I can when using the aseptic type. This is particularly true where the anastomosis is done deep in the pelvis or where adequate mobilization of the bowel is difficult.

There is no doubt but that in the aseptic type of anastomosis the original lumen is small and, with postoperative edema, may temporarily close off entirely. In confirmation of this, it was our observation that not infrequently there would be no postoperative passage of gas for as long as five days but there would be bowel distension and rumbling of gas, finally terminating in the sudden passing of a large amount of gas and/or stool.

Our method of anastomosis is simple and no doubt much the same as used by most surgeons where open operation is employed. Through an adequate abdominal incision the tumor is exposed. Blood supply is observed, and the blood vessels of the segment of mesentery to be removed are ligated. The amount of mesentery removed depends upon the presence or absence of enlarged mesentric glands adjacent to the growth. The bowel wall is then carefully denuded of fat, including the appendices epiploicae for a distance of 1.5 cm. from the margins of the anticipated anastomosis. The bowel ends are then gently milked back for some distance from the steel clamps and a soft rubber clamp applied at sufficient distance to allow free manipulation of the ends to be anastomosed. Two thin-bladed clamps are applied to the bowel at either end of the segment to be removed. They are applied to the bowel at an angle sloping inward toward the mesenteric border in order to give a larger lumen following anastomosis and, more important, to provide a better blood supply to the anti-mesenteric side of the bowel. The bowel is divided along the clamps with a scalpel and the segment containing the tumor removed. The exposed lumen of the cut ends of the bowel are swabbed with small gallbladder sponges saturated with alcoholic merthiolate solution. The ends are united with a continuous Lembert suture of Number 00 chromic catgut on an atraumatic needle. A row of Number 2 test silk interrupted, plain or Halstead sutures are inserted. The anastomosis is tested for patency. The suture line is loosely covered by nearby fat tags and the rent in the mesentery closed. Three grams of sulfanilamide is dusted around the region of the anastomosis.

In sigmoid growths a small soft rectal tube is inserted into the rectum and passed through the anastomosis. It is anchored in position by a silk suture near the anus. As a matter of fact, I believe the tube unnecessary but is a carry-over from the time when it was felt that the anastomosis might be too tight. At least the patients with growths higher in the colon where a tube cannot be passed, seem to do equally well.

Postoperative Treatment

Wangensteen nasal suction is inserted in every case. This is continued until flatus or stool is passed freely. In many instances, peristaltic action is established in 24 hour and usually within 48 hours. As soon as gas or stool is passed the rectal tube is removed. Occasionally it is necessary to continue suction for several days, this being true more often in elderly patients who frequently have rather poor muscular tone. After 24 hours, the patient is given an ounce of mineral oil twice daily. If suction is still in place, the tube is clamped off for two hours following ingestion of the oil. Oil is continued in sufficient amounts to produce one or more soft stools daily.

The penicillin which was begun the day before operation is continued. Five grams of sodium sulfadiazine is given intravenously in divided doses over each 24-hour period. This medication is usually continued for 72 hours, but may be continued longer if it seems advisable. As soon as suction is removed, sulfasuxadine therapy is resumed. Perienteric fluids are given until suction is removed and the patient is able to take adequate fluid and foods orally. The average amount of fluid given peri-enterally is 3000 cc.: intravenously 1000 cc. of 5 per cent glucose in distilled water, 1000 cc. of 5 per cent glucose, and 5 per cent amigen in distilled water. 1000 cc. of normal saline is given subcutaneously. Vitamins are added to the intravenous solution, including 300 mg. of Vitamin C, and an ampoule of soluble B.

Excessive sweating, elevation of temperature, excessive drainage through the suction tube, may necessitate the giving of larger amounts of fluid. Personally, I would rather see a patient a little dry than waterlogged with too much fluid. Practically, if the tongue is moist and the patient is excreting 800 cc. of urine a day, the fluid intake is usually adequate. The use of chewing gum and acidulated fruit drops will often relieve the sensation of thirst and help prevent parotitis.

Recently we have been getting our patients out of bed much earlier than we did some years ago. This, of course, is now an accepted procedure. The patient is encouraged to move about freely in bed, and he is given passive motion and massage. He is usually up in a chair on the second day and is ready to leave the hospital in seven to ten days. I realize, of course, that many patients are sent home from the hospital much earlier than this but I find that the average patient is emotionally better adjusted if he is not pushed out of the hospital too fast.

Conclusion

1. The earliest symptoms noted by the patient in cases of colonic cancer are bleeding, intestinal cramps, or soft diarrheal stools. None is pathognomonic of colon malignancy but their importance lies in calling attention to the fact that some abnormality exists which demands careful examination.

2. X-ray is the most efficient method of examination, not because a definite diagnosis can be made in every case, but because it often indicates whether or not surgical intervention is advisable.

3. Most cases are not emergencies. Ample time may be taken for preoperative rehabilitation.

4. Except in cases of high-grade obstruction, single stage operation is preferable to multiple stage procedures.

5. It is my belief that an open type anastomosis offers many advantages over the so-called aseptic anastomosis.

6. The use of sulfas and antibiotics has practically eliminated the danger of peritonitis or serious infection which may occur at time of operation. They do not prevent infection or peritonitis which may occur later from a leaking anastomosis.

7. As in other surgery, early ambulation is advisable.

NORTON MEDICAL AWARD INVITES MANUSCRIPTS

W. W. Norton & Company are again offering the Norton Medical Award for book manuscripts written for the lay public by professional workers in the field of medicine. Terms of the Award have been slightly altered. The publishers now set no final closing date for the submission of manuscripts which may be submitted at any time, the Award not being limited to any one year. The Norton Award offers $5000 as a guaranteed advance against royalties. Either complete manuscripts or detailed table of contents together with one hundred pages of manuscript may be submitted. A descriptive folder giving full details of the terms of the Award may be secured on request from the publishers, W. W. Norton & Co., Inc., 101 Fifth Avenue, New York 3, N. Y.

Books that have previously won Norton Medical Awards are *The Doctor's Job,* by Carl Binger, M.D., *Doctors East, Doctors West,* by Edward H. Hume, M.D., and *A Surgeon's Domain,* by Bertram M. Bernheim, M.D., published this spring.

Football Injuries

(*A Ten Year Review of Football Injuries at Princeton University*)

Harry R. McPhee, M.D.[*]
Princeton, New Jersey

If you had been a member of the Princeton football squad from 1933 to 1942, inclusive, your chances of being injured would have been 69 in 100, and once injured there was a 70 per cent chance that you would have been on the injury list again. You could have counted on being out of commission for 5.2 days with each injury, that is, unless you had been one of those unfortunates in each 25 who was injured in such manner as to require you to retire for the season, or the one in each 100 who was forced to retire permanently from contact sports.

These statements may sound a trifle startling but they can be supported by recorded statistics from the football medical reports of that period. Of course, it is reassuring to know that many bare figures are much more attractive in suitable clothing. And thus it is with these. An analytical coverage will gracefully curve the sharp angles and fill in some of the unattractive hollows.

Approximately 780 men participated in varsity and scrub football during this period. They played an eight-game schedule for the most part, but in 1935 and 1937 there were nine games. With the exception of these two years, the seasons were about ten weeks in length and double practices were held in the first two. Hence the squad gathered on the field about seventy times each year or seven hundred times in the period under review, and a doctor was present every time.

The doctor personally saw and supervised the treatment of every injury, and determined when the player could return to the game. He kept track of each injury that caused the loss of one or more days from the practices, or that might have a more remote consequence such as a fractured tooth. The records therefore were very complete and contained some insignificant material. In other words, some of your 69 chances of being injured were of a minor nature.

Eight men, or approximately 1 per cent of the squad, were injured to such a degree that they had to drop the sport permanently. In this group were three knee, three back and two head injuries. The most serious was a complete, backward dislocation of the lower leg at the knee. The blow fell when the full weight, some 240 pounds, was on the leg. The terrific stretching and tearing of the tissues, so scored the inner lining of the main artery to the lower leg that a firm clot formed in the vessel before collateral circulation could possibly be established. After a week of struggling it was finally decided to remove the leg at the knee. The player is leading a useful life through the medium of an artificial limb. The other knee cases, though major injuries at the time, have recovered sufficiently for a normal life except for football and other strenuous contact sports.

One lad fractured a vertebra in the neck and made a complete recovery. It is possible that he could have played again, but he was advised not to do so. This same advice was given to a boy who had fractured his neck several years before coming to Princeton and the X-ray showed some residual bony changes. He had played football throughout preparatory school and was upset by the advice. He counselled his parents and a specialist. After careful study, they decided the risk was normal and felt he should be permitted to play if the university was relieved of any responsibility for the decision. All went well for a long time. Then came the blow that precipitated lasting trouble for this young man. In this case there were other factors which contributed to the disability, and perhaps a similar attitude should be taken in the remaining back case. This student had been in good health until a transverse process was broken in the lower back. Similar injury had occurred to several other players without consequence and his healed according to schedule. However, troublesome eye symptoms developed soon afterwards and some felt there was a relationship to the injury, but this was difficult to verify.

Head injuries which disturb the mental processes temporarily always pose a problem for the team physician in evaluating subjective symptoms. He could simplify the problem by discontinuing the player in football permanently any time he sustained such an injury. That would be unfair to the student because most of them recover and show no continuing effect. When they come in a series, due either to the lad's inability to keep his head out of the way, or an undetermined factor which makes him prone to concussions, then it is time to call a halt. This was done in two cases where the players insisted on putting their heads in the wrong place at the wrong time, and it was felt they should discontinue the sport before some serious development occurred.

Thus it can be seen that analytical coverage of the cases which were permanently dropped reduces an ugly angle to a gentle curve. It reveals that only three of the eight had significant carry-over effects, and the contention that Princeton football was to blame can be questioned in two of the three. No modification can be made for the 31 cases which were discontinued for the balance of the season. They were bona-fide injuries charged against football, and involved 12 sprained knees, 16 fractures, a contused kidney, a sprained back and a severe laceration and contusion. All recovered fully, and, in passing, it might be of interest to note that three of the fractures were of transverse processes in the lower back, similar to the case that developed eye symptoms.

In addition to these 39 cases, there were 524 individuals who were injured 889 times in the ten year period. The average time lost from practice was 5.2 days per case and since the total man-days was 46,800, it means that this group of injuries caused about 10 per cent of it to be lost. It is difficult to fill this hollow, but it does have a good and a bad feature. On the good side is the fact that only 30 per cent of the injuries were severe enough to lose more than five days. Hence your chances of having a time-consuming injury would have been 21 instead of 69 in 100. On the bad side, it is a lot of time to lose and was one of the many factors that made things "easy" for the coaches, but they would have settled gladly for five days per injury if that had been all there was to it. The unfortunate part was that half of the 30 per cent of injuries over the average were to important men, and when important men lose ten days or more it hurts. One extreme example of this was demonstrated by a captain who missed 40 of the 70 practice sessions with a painful sprain of the shoulder. He participated in the games by using a special brace, and although his efficiency was reduced, and his wound freshened, he gave much needed morale to the squad. Lest you wonder why he was not withheld from games until the shoulder healed, let it be said that you would have had to know him. It would have been a mistake to keep him out, especially since it was certain that he would not suffer harm in later life.

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As might be expected, bruises, of which there were 318, formed the largest class of injury. Sprains of various joints with 267 ranked second. There were 87 strained or pulled muscles, 70 fractures, 60 concussions and 20 dislocations. The balance was constituted by lacerations, teeth injuries and the like. Bruises usually clear without trouble, but occasionally calcium is deposited in the hematoma and prolongs the healing. This occurred seven times in the series. All but one subsided beautifully and it had to be removed surgically.

The knee was sprained 86 times. Eight required surgical interference to restore normal stability and, as previously stated, one was amputated. In all, 3 were dropped permanently, 9 temporarily, and the other 72 knee sprains caused an average loss of 10.6 days each. The ankle suffered 67 sprains with no cases dropped. Each case averaged one week, but the following notes on ankle injuries taken from the football reports throw more light on how a few injuries run up the average.

1933—"One third of the injuries absorbed 78 per cent of the time lost."

1935—"There were two cases both in the same man who would not use ankle wraps as instructed."

1936—"There were six cases with an average loss of 6.5 days. Four were without ankle wraps and the two that wore them lost one day each."

1941—"Five cases averaging 14.4 days lost. Only one was wrapped, but this and another case, costing 10 and 19 days respectively, were clipping injuries against which there is no protection."

All men were instructed how to use the wraps and ordered to do so, but some would take the chance rather than feel restricted.

The strain and fracture cases all made complete recoveries. The 60 concussion cases cleared without any hang-over symptoms. It will be recalled that two were dropped before this mishap could take place. Seven of the 20 dislocations were of the humerus at the shoulder; two required surgery. The elbow was dislocated twice; both cases healed without incident.

An interesting sidelight on your chances of injury lies in the pre-season training period. If you escaped the first three weeks without injury you reduced the menace about 50 per cent. The reasons for this were not peculiar to the times. They exist today and, as a matter of fact, 51 per cent occurred in the first three weeks of this last season. Double practice sessions contributed by affording more opportunities for contact at a period when the condition of the men was relatively poor. It also did not allow minor bruises much time to recover between practices, and they in turn united with fatigue to reduce normal reaction times. Fatigue, faulty execution, too hasty return to the game after injury, and inadequate protection were and are the "Four Horsemen" of football injuries. Recent national statistics released by the Committee on Injuries and Fatalities of the American Football Coaches Association tend to emphasize the element of fatigue. They show that the majority of direct fatalities in 1946 occurred during the second or fourth period of regularly scheduled games.

1934 was the worst year for injuries. There were 125 cases in a squad of 75. The pre-season period that year was hot, humid and debilitating. Dysentery struck the squad, and it was injury-prone in this weakened condition. For example, there were 8 knee injuries during the season, and 5 of them happened in the first ten days. The number of injuries took a 30 per cent drop under any previous low in 1940, and dropped still more in 1941. There were 54 cases in 1940 with a squad of 75 and 49 in 1941 with a squad of 72. The reason for these favorable records was largely good equipment. In the spring of 1940 an exhaustive study of equipment was made, with many dealers submitting samples. Each sample was analyzed from the standpoint of construction, comfort and protection to the player during spring practice, and durability as shown by condition at the end of the spring period. The best obtainable was purchased and the above figures attest the value of so doing.

All in all then, being a member of the Princeton football squad in the decade before the war was not quite as bad medically as it started out to be in the opening paragraph of this review. You would have taken some chance on being injured with a small risk that it would be permanent. Against this, you could contrast an era of success in which there were two unbeaten teams, a Rose Bowl bid and a 60 per cent chance of beating Yale. You might even have been one of those fortunate players who, for the first time in Princeton football history, faced Yale four seasons in a row and licked them each time.

Gout

Based on a Five Year Study of 1500 Arthritic Patients

H. Archibald Nissen, M.D.
Boston, Massachusetts

Gout is a disease of unknown etiology. The classical textbook picture of gout is rare in this country. From time to time an article is published directing attention to the "forgotten disease." Emphasis, as a rule, is placed on the requirements of a familial history of gout before one considers such a diagnosis; secondly, a history of the passage of a urate stone and/or the presence of tophi is required, also a blood uric acid determination of 6 milligrams or over 100 cc.; whereas 1 to 4 milligrams is considered normal.

If one applies these criteria to patients complaining of swollen, painful joints, almost any joint of the body, and a history of intermittent attacks of joint flare-ups with normal function of joints between attacks, and none of the above requirements can be fulfilled in making a diagnosis of gout, how many physicians would consider gout as a diagnosis?

This same history is commonly obtained from patients with the diagnosis of arthritis. In analyzing the records of 1500 patients, there were 251 who had been diagnosed as arthritis elsewhere but which the author shall diagnose as gout. These 251 patients represent 16.75 per cent of the 1500 group. Their blood uric acid determinations were over 4 milligrams, the majority under 6 milligrams per 100 cc. They were between 27 and 80 years of age. The duration of their joint history ranged from a period of one week to fifty years. Not one gave a family history of gout. Four had previously-recognized gout, only three had tophi, not one had passed a urate stone. Some gave a history of joint upset once or twice a year, some had almost continuous discomfort. Other complaints included: sensitivity to barometric and climatic variations; purplish-red, swollen, hot joints; warm, red, swollen joints; stiffened, painful joints; slightly enlarged swollen wrists with pain; intermittent attacks of shoulder pain, with limitation in motion; at times the elbows were involved. The largest number, however, complained of knees, hips and lower back. Some recognized increased joint upsets with emotional disturbances; others recognized the precipitating action of certain meats, certain alcoholic beverages, anger, fatigue, traumata.

The X-ray studies of this group were made by Drs. P. F. Butler and Charles W. Blackett of Boston, who made a diagnosis of typical gout in 21 in this group. In other words, a little over 8 per cent in a group who did not meet the requirements to make a diagnosis of gout.

Their uric acid determinations were checked and rechecked on whole blood as well as blood serum. Practically all determinations were made during the morning hours. The uric acid determination of this entire group ranged from 4.0 to 13.1 milligrams per 100 cc. These cases probably would be called "gouty arthritis" but in the author's opinion, they should be termed "gout." These patients were treated for gout and the proof of this diagnosis is in the definite, favorable response to the intravenous treatment with sodium salicylate, sodium iodide and colchicine (sodium salicylate grs. 15½, sodium iodide grs. 15½, and colchicine 1/100 of a grain). This group also showed greater arteriosclerotic change as revealed by X-ray films, also more kidney disturbances, with albumin, periods of casts, white and red blood cells and an increase in the uric acid content than a group with normal blood uric acid determinations. The same therapy given to other patients with definite arthritis produced no relief whatsoever.

Let us refer to a previous paper by the author which proves the value and accuracy of the Life Course studies of 500 arthritics.[1] There were 45 patients in *Life Course A;* 295 in *Life Course B;* 115 in *Life Course C;* and 45 in *Life Course D.*

Life Course B was composed of 17 per cent rheumatoid and 83 per cent degenerative (so-called) soft tissue and joint changes, or non-rheumatoid. This course is made up of remissions and relapses. *Life Course C* was 100 per cent rheumatoid arthritis, or 23 per cent of the group, and their life course was one of no remissions or relapses.

To return to the present study, the 251 patients are those who had remissions and relapses. They are candidates for *Life Course B* because it is the only course in which remissions and relapses are found consistently. This is a confirmation that these 251 are gout with the textbook picture of remissions and relapses and abnormal uric acid determinations.

As to the treatment in detail, the author uses the following diet: meat and animal fat in large quantities, all vegetables, including potatoes and rice, all fresh fruits, oleomargarine, skimmed milk, no flour products, no cereals, no refined sweets, average condiments and sugar. Tea, coffee, water, Knox's gelatine; moderate consumption of alcohol allowed sparingly.

As to medication, intravenous use of colchicine with sodium salicylate, and sodium iodide is administered on several successive days, producing marked relief from pain, swelling and stiffness. As a rule, three intravenous injections a week is the high average. If the acute attack is cleared up in one week, no further intravenous treatments are given. Some do better with one or two treatments a week for several weeks. No one of these 251 patients had to have prolonged treatment, that is, over three weeks. In the patients whose protein intake had been 30 grams daily or slightly over, additional protein was given orally in the form of Delcos Granules.* Also

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Read by invitation before the 66th annual meeting of the South Dakota Medical Association, June 3, 1947, at Rapid City, South Dakota.

*Sharp and Dohme, Inc., Philadelphia.

if the dietary history of the patient indicated a vitamin deficiency, they were given 6 to 10 capsules daily of Squibb's Therapeutic Formula. After two to three weeks this was dropped to a maintenance dose of three a day. Some of the patients, whose joints subsided but who had sustained muscle stiffness and soreness, received several intravenous injections of sodium ascorbate and 1 to 2 cc., intramuscularly, of Walker's Amvitol,‡ a preparation of the amino acids and B-Complex. Contrary to the belief that liver injections precipitate gout reaction, those in this group who showed chronicity, indigestion and fatigability, were given the crude liver preparation, Campalon,§ intramuscularly, 1 to 10 cc. weekly. A number of men and women in this group, the majority of whom were between the ages of 40 and 60 years, with depression, moodiness, flashes, etc., were given the hormones (male and female) by injection and orally, with astounding results. Active resistant exercises and rest periods were outlined for practically every patient. Inactivity and too much rest were discouraged.

This study proves the value of a routine blood uric acid determination of every patient complaining of joint involvement. It should be, definitely, part of the regular laboratory routine.

In closing, if the normal blood uric acid determination is 1.0 to 4.0 milligrams per 100 cc. of blood, then any determination over 4.0 milligrams is abnormal.

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†E. R. Squibb and Sons, New York City.

‡Walker Vitamin Products, Inc., Mount Vernon, New York.

§Winthrop Chemical Co., New York City.

REFERENCE

1. H. Archibald Nissen: The Significance of the Life Course (or Level of Functional Activity) of the Chronic Arthritic. J. Maine Med. Assoc. 26:12 (Dec.) 1935, pp. 181-189.

Physician's Statement Required for Cash Sickness Benefits for Railroad Workers

A cash sickness benefit system for railroad workers will begin operating throughout the nation on July 1. These benefits were added under the 1946 amendments to the Railroad Unemployment Insurance Act and provide partial compensation for wage loss due to disability on the same basis as that due to unemployment. The system will be administered by the Railroad Retirement Board, which administers the Railroad Unemployment Insurance Act.

All disabilities which prevent railroad employees from working, regardless of how or where they occur, are covered under the program. In the first year of operations, about 300,000 of the 2,075,000 railroad workers qualified are expected to receive benefits, and the total amount of benefits is expected to reach $36,000,000.

A physician's statement of sickness will be required before claims can be paid. It is believed that the program will require about 650,000 medical examinations a year. Employees are free to choose their own doctors, and any physician to whom an employee goes for examination or treatment may supply the information required as initial proof of an employee's claim.

The forms on which medical information will be requested from a physician are the "Statement of Sickness" and the "Supplemental Doctor's Statement." The first mentioned form is intended primarily to obtain information at the beginning of each illness, and the second is intended to obtain additional information only when such information is needed later on in the same illness. The statements are designed to furnish, as simply and as conveniently as possible for the physician, the minimum information required for Board purposes.

The "Statement of Sickness" on which the medical evidence is to be furnished must be mailed to the appropriate office of the Railroad Retirement Board within seven days after the first day claimed as a day of sickness, or the employee may lose part of his benefits. Claims for succeeding fourteen day periods may be allowed for a predetermined period as indicated by the medical evidence on the doctor's initial statement, but in continuing illnesses supplemental information about the patient's illness may also be requested from the physician.

Claims will be filed and adjudicated in the regional offices of the Railroad Retirement Board. These offices are located in Atlanta, New York, Cleveland, Chicago, Dallas, Kansas City, Minneapolis,* Denver and San Francisco, and serve the adjoining territories. Each will have a physician who will act as a medical consultant. Additional information about the program may be obtained from any of the aforementioned offices.

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*Serving Minnesota, North Dakota, South Dakota and Montana.

Is Immunization of Student Nurses Against Scarlet Fever Justified?*

Ramona L. Todd, Ph.D., M.D.
Minneapolis, Minnesota

Scarlet fever has been a relatively mild disease in recent years. Whether this mildness is a temporary low phase of the cycle of the virulence of the causal organism is not known, but it is true that the duration and severity of the disease have decreased since the sulfonamides and penicillin have been available for treatment. There have been fewer complications and less disastrous sequelae where chemotherapy has been used. Such changes in the character of the disease have led to a reconsideration of the question of the advisability of scarlet fever immunization procedures. The two common objections to the administration of materials designed to produce resistance to scarlet fever are: (1) the frequency of the occurrence of generalized reactions and (2) the belief that the immunity produced is only against the toxin and does not necessarily afford protection from bacterial invasion of the streptococcus causing the disease.

In view of these changes, it seemed of interest to review our experience with scarlet fever immunization procedures in student nurses at the University of Minnesota with special attention directed to generalized reactions and duration of resistance as evidenced by subsequent Dick tests.

Students who entered the school during the years 1942-43 and 1943-44 were selected for the present study because many of them were available for personal interviews and sufficient time has passed since they received scarlet fever toxin inoculations to permit subsequent Dick tests to be applied. There were 540 students included. Of these, 208, or 38.5 per cent, reacted to the Dick test at the time of entrance to the School of Nursing, and 327, or 60.6 per cent, did not react (Table 1). There were five individuals whose reactions were questionable, an area of redness just less than 10 mm. in diameter developing within 24 hours after the injection of 0.1 cc. of scarlet fever toxin. Since strict adherence to the 10 mm. division between positive and negative reactions was observed,[1] these five were recorded as "questionably positive."

Table 1

Results of Dick Tests (Student Nurses)

Dick Test on Admission	1942-44 Number	1942-44 Per Cent
Positive	208	38.5
Negative	327	60.6
	5?	0.9
Total	540	100.0

The 327 individuals with negative Dick tests were given subsequent tests approximately one year later with the following results: 293 remained negative, 25 were positive, and 9 were questionably positive. Of the 293 whose tests remained negative, 162 had no history of scarlet fever and no previous scarlet fever immunization procedures, 85 had a history of scarlet fever, 45 had scarlet fever inoculations for immunization, and 1 had scarlet fever in childhood and had received an unknown amount of scarlet fever toxin eight months before she entered the School of Nursing. In the entire group, there were 96 individuals who had had scarlet fever, two-thirds of whom were known to have developed the disease in the elementary school age.

Reactions to Scarlet Fever Toxin

Of the 208 persons with positive Dick tests on entrance to the School of Nursing, 142 were available for interview and study of reactions to the scarlet fever toxin administration. Those students whose Dick tests were positive were given five subcutaneous injections of scarlet fever toxin in graduated doses. Inoculations were given at weekly intervals, the first injection consisting of 650 skin test doses, the second 2,500 skin test doses, the third 10,000, the fourth 30,000 and the fifth 100,000 to 120,000 skin test doses. There were 90, or 63.4 per cent, who developed generalized reactions to one or more inoculations. Of these, 64 lost time from school or hospital duty, and 108.5 days were lost, ranging from one-half day to six days per person (Table 2). There were 26 whose symptoms were so mild that bed rest or loss of time was not necessary. The average time lost in the immunized group was .76 day, but the illnesses were distributed among the 64 students whose average loss was 1.7 days.

Table 2

Time Lost from School or Work Because of Generalized Reactions Following Scarlet Fever Toxin Inoculations

Days Lost	Number of Persons
0.5	11
1.0	25
1.5	1
2.0	15
2.5	1
3.0	5
4.0	3
5.0	1
6.0	2

There were 40 individuals who experienced an unfavorable reaction to one inoculation only (Table 3), and 23 who had reactions following two of the five injections. There were 14, or approximately 10 per cent of those receiving inoculations, who became ill after every one of the five injections. The first inoculation provoked unfavorable reactions in 33 persons, while 21 experienced the first generalized reaction after the second injection of toxin. There were 20 who had the first reaction following the third inoculation, 6 after the fourth, and 8 after the fifth. There were two individuals who

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*From the Students' Health Service, University of Minnesota, Minneapolis.

Table 3

Number of Reactions to Scarlet Fever Toxin Inoculations

Reaction to	Number Having Reactions	Per Cent of the Total Having Reactions	Per Cent of All Those Inoculated
1 Inoculation	40	44.45	28.1
2 Inoculations	23	25.55	16.2
3 Inoculations	8	8.90	5.6
4 Inoculations	5	5.55	3.5
5 Inoculations	14	15.55	10.0
Total	90	100.00	63.4

reported mild reactions with no time lost who were not sure when the first reaction occurred.

Symptoms attributed to the scarlet fever toxin inoculations are summarized in Table 4. The most frequent symptom was nausea which was reported by 82.5 per cent of those having reactions which represents a little over half of all the persons receiving inoculations. Vomiting occurred in 20 per cent of the individuals inoculated. The second most frequent finding was fever. Actual readings at the Health Service of 99.4° F. and above were recorded in two-thirds of the subjects who had generalized reactions. General malaise and headache were reported by a number of persons. An important observation was the appearance of a red, punctate rash following injections of toxin in 8.7 per cent of those inoculated. Joint and muscle pain, diarrhea and sore throat were other symptoms reported.

Table 4

Symptoms Attributed to Scarlet Fever Toxin Inoculations

Symptom	Per Cent of All Persons Having Generalized Reactions	Per Cent of All Persons Inoculated
Nausea	82.50	52.1
without vomiting	(50.00)	(31.6)
with vomiting	(32.50)	(20.5)
Fever		
(Temp. 99.4° F. and above)	66.25	41.9
General Malaise	41.25	26.1
Headache	25.00	15.8
Rash	13.75	8.7
Joint and Muscle Pain	12.50	7.9
Diarrhea	7.50	4.7
Sore Throat	2.50	1.6

There were eight people whose reactions were so severe that inoculations were discontinued before completion of the series. Of these, four were stopped after the third injection, two after the fourth, one after the first, and one after the second. There were 33, or 23.2 per cent, whose reactions were less severe but sufficiently discomforting to warrant dividing succeeding doses (Table 5). The remaining inoculations were administered weekly in half doses until the total number of units of toxin was given. Either very mild or no reactions occurred after the smaller doses.

Table 5

Number of Reactions Necessitating Changes in Immunization Procedure

Time of Change	Number with Reactions Severe Enough to:	
	Discontinue Further Inoculations	Divide Succeeding Inoculation Doses in Half
After first inoculation	1	9
After second inoculation	1	10
After third inoculation	4	5
After fourth inoculation	2	9
Total	8	33
Per Cent of Those Inoculated	5.6	23.2

A comparison was made of the past histories of the subjects and the reactions to inoculations (Table 6). There were 11 individuals who had previous scarlet fever immunization procedures and nine of these had generalized reactions to the injections administered during the present study. While the groups are too small to draw definite conclusions regarding sensitization to scarlet fever toxin, it is noteworthy that only two of the 11 did not experience illness after toxin administration. There were also 11 persons with a history of scarlet fever. Of these, five had generalized reactions.

Table 6

History of Scarlet Fever or Immunization Procedure and Reaction to Toxin

History	No Reaction	Generalized Reactions			
		No Time Lost	One Day Lost	Two Days Lost	Severe Reactions
Scarlet Fever	6	1	1	2	1*
Previous Scarlet Fever Immunization Procedure	2	1	6	0	2*

*Inoculations discontinued before completion of series.

In view of the frequency of generalized reactions, and the fact that 108.5 days of school were lost because of such reactions, it is a question whether such an immunization procedure is worthwhile. Since scarlet fever at the present time is a mild infection and methods of treatment have improved markedly in recent years, there must be some doubt whether the disease in a group of this size would cause as much loss of time as the toxin inoculations did.

Subsequent Dick Tests

Of the 208 individuals who reacted to the Dick test, 166 received inoculations of scarlet fever toxin and had Dick tests six to twelve months later (Table 7). There were 18.7 per cent whose tests remained positive and 1.8 per cent with questionably positive tests after five inoculations. There were 137 of the 142 who were studied and interviewed who had subsequent Dick tests. Those who had generalized reactions to the toxin did not develop resistance as measured by the Dick test to the extent of those with no unfavorable reactions. Of those with generalized reactions, there were 26.1 per cent

Table 7

Subsequent Dick Tests — Six to Twelve Months After Toxin Inoculations

Reactions to Inoculations	Subsequent Dick Tests						
	Negative	Per Cent	Positive	Per Cent	Questionably Positive	Per Cent	No Test
Total who received inoculations—192	132	79.5	31	18.7	3	1.8	26
Study Group:							
No reactions—52	42	85.7	7	14.3			3
Generalized reactions occurred—90	62	70.5	23	26.1	3	5.4	2

whose tests remained positive and 5.4 per cent with questionably positive tests, while of those who had no generalized reactions, there were only 14.3 per cent whose subsequent tests remained positive.

Summary and Conclusions

1. Of 540 students nurses, 208, or 38.51 per cent, had positive Dick tests on admission to the School of Nursing.

2. Of the whole group, 96 gave a history of having had scarlet fever; 11 of these had positive reactions to the Dick test; 63, or approximately two-thirds, had scarlet fever while in elementary school age.

3. There were 142 students who received scarlet fever toxin inoculations who were studied and interviewed regarding generalized reactions. Of these, 90 had generalized reactions to one or more inoculations.

4. A total of 108.5 days of school was lost because of reactions. The average time lost in the immunized group was .76 day, but the range was 0.5 to 6 days.

5. The most frequent reaction symptoms were nausea and vomiting, fever, general malaise, and headache.

6. About one-fifth of individuals who received five scarlet fever inoculations still had positive Dick tests six to twelve months later. Of those who suffered no untoward reactions, 14.3 per cent had positive Dick tests after the series of toxin inoculations, while 26.1 per cent of those who experienced reactions still had positive tests and 5.4 per cent were questionably positive.

7. Because of the frequency of generalized reactions and the time lost from school due to such reactions, it is doubtful whether scarlet fever immunization procedures for student nurses are worthwhile.

Reference

[1] Dick, George F., and Dick, Gladys H.: Scarlet Fever. The Year Book Publishers, Chicago, 1938, p. 80.

SCHOLARSHIPS TO PROVIDE RURAL PHYSICIANS

The Illinois State Medical Society has made public a proposal that the state legislature establish a revolving fund of $50,000 a year for ten years for education of physicians to serve in rural areas, as a means of relieving the shortage of doctors in downstate Illinois. The Committee on Rural Medical Service of the society (Dr. Harlan A. English, Danville, chairman) has been studying the problem for months, conferring with farm organization leads and others. The funds proposed would be broken up into $7,000 maximum scholarships to be made to sons and daughters of Illinois rural families who meet preliminary educational requirements. The money would be returned to the fund by the beneficiary within a reasonable time after he is in practice, to be reused for another similar scholarship. The candidate would have to pass the admitting board of the University of Illinois College of Medicine, Chicago, as would any other intending medical student. The final condition would be the candidate's willingness to agree to practice in rural Illinois, at least until his scholarship is repaid. For purposes of the plan, rural Illionis is defined as including communities of fewer than 10,000 population.—*Federation Bulletin,* April, 1947.

Successful Nephrectomy in a Three-Day Old Infant

R. E. Brogan, M.D.
Billings, Montana

EMBRYOMA of the kidney is also known as sarcoma, adenosarcoma, mixed tumor, Wilm's tumor and carcinoma of the kidney. It could just as well be called a "rebel tumor" for it is in a class by itself, being radically peculiar in all its aspects.

From a pathological consideration, it is strange that its size has no relation to its degree of malignancy and even stranger still that its malignancy cannot be graded by its histologic structure.[1] It may fill the whole abdomen and, as in our case, displace the heart and lungs without rupturing its capsule or eroding into adjacent organs. It can completely replace the kidney tissue and destroy every clue as to its origin both grossly and histologically. The five-year surgical cure standard does not apply to this malignant tumor. Eighteen months seems to be a safe and fortunate time limit.[2] The tumor is quite well limited to the first seven years of life.

Embryologically, it seems strange that an epithelial organ like the kidney should give rise to a developmental tumor with connective tissue (sarcomatous) characteristics. This, however, is explained by recalling that the epithelium of the urinary tract is derived from mesoderm (intermediate cell mass) and the convoluted tubules develop from undifferentiated mesenchyma which has the appearance of cellular connective tissue in which glandular structures are formed. Boyd [3] can only explain the presence of muscle and cartilage as "a perversion of growth on the part of the embryonic mesenchymal cells."

Symptomatically, the rebel nature of the tumor again becomes apparent and is best shown by the fact that most authors on the subject admit that the mass is first found by the mother in the care of the child. It is surprising how large these tumors can become without producing symptoms or findings other than found by an observing mother.

Laboratory findings. Certainly one would expect some definite laboratory findings but usually there is a normal urine analysis and the non-protein nitrogen values are not disturbed. However, there is usually a secondary anemia.

Diagnosis. Diagnosis is usually easy. The vast majority of abdominal tumors in children are embryoma of the kidney. The mass is firm and fixed. Films of the abdomen without contrast medium show a slightly opaque mass with displacement of intestines to the opposite side of the abdomen. Pyelograms give additional information but are not considered necessary. Retrograde pyelograms necessitate an extra anesthetic and, therefore, would be ultra-scientific. An intravenous pyelogram may be indicated if in doubt.

Treatment. The work of Ladd and Gross has been a tremendously encouraging factor. Considerable pessimism has sprung up regarding the prognosis for children with this neoplasm, and while it is still true that the mortality is high, the outlook it not as hopeless as many textbooks and reports would suggest. A review of the Boston Children's Hospital material indicates that about 25 per cent of the patients can be permanently cured by methods presented by these men and followed in the course of the case report below.

Case report. Correspondence with Dr. W. E. Ladd, as well as extensive review of the literature, leads us to believe that this case is the first embryoma of the kidney large enough at birth to be so diagnosed and to be successfully treated surgically earlier than two months of age. We believe it is the first case of embryoma of the kidney that completely replaced the kidney to the extent that its origin could not be histologically identified, and to contain bone. An oddity among oddities is that it could attain such a tremendous size as to displace the heart to a vertical position and yet present no evidence of metastasis to other organs, and that the baby was quite vigorous at birth and caused no immediate concern.

The mother, aged 21, was seen on seven occasions for prenatal care. She required Lextron medication throughout to control a secondary anemia. Her serological tests were negative. A routine X-ray at 8½ months showed a vertex presentation and an ample pelvis. Otherwise there were no unusual features. Labor commenced on the estimated day and the first stage was prolonged; position R.O.P. Low forceps were applied and the head delivered with little difficulty. Manual delivery of the anterior shoulder was necessary. There was considerable difficulty in extraction following delivery of arms. The baby cried immediately and seemed vigorous. A noticeable protrusion of the abdomen was observed. The delivery otherwise was uneventful.

Immediate examination of the baby revealed a long hard mass a little to the right of the abdominal midline and high. Hypertrophic pyloric obstruction occurred to us but the mass was quite movable and bony hard. This later proved to be a piece of bone which moved within the tumor mass itself. It added to the confusion of the immediate diagnosis. Physical examination of the baby revealed a somewhat labored respiration but otherwise it was normal. The following day a G.I. barium feeding through a stomach tube showed no pyloric obstruction but did show the mass on the left side. Definite areas of calcification were apparent. The mass forced the heart to a vertical position and to the right. The lung fields were definitely encroached upon. On this day, edema of the scrotum was apparent and the abdomen was more distended. The R.B.C. was 4,460,000, Hg. 73 per cent, W.B.C. 14,200. The urine was negative. The Rh was positive for the baby and mother. The N.P.N. was within normal limits. The baby was typed and blood available. The temperature was close to normal.

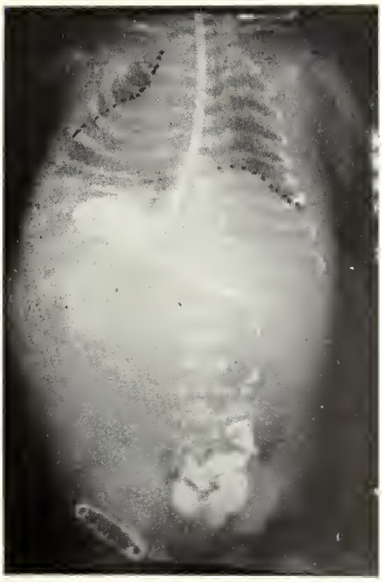

Fig. 1. Taken one day before operation, showing upward displacement of heart and encroachment of lung fields. Calcified masses are present in the tumor mass. Barium passes freely from the stomach. Note lateral expansion of ribs.

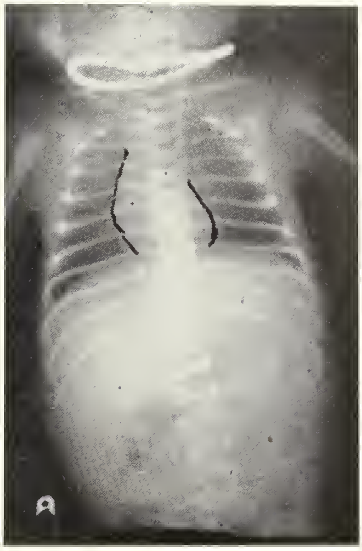

Fig. 2. Taken a few days following surgery. Note normal relationship of heart to adjacent organs.

A diagnosis of embryoma was made without the aid of pyelograms and the baby was operated upon on January 22, 1947, 72 hours after delivery. The preoperative measuers were limited to saline glucose by clysis and vitamin C. A light ether anesthetic carried the baby through the 48 minute operation. A long left rectus incision gave adequate exposure and extended from the costal margin well down to the pubis. On opening the peritoneum a large gush of dark red fluid escaped. I believe the capsule and peritoneum over the mass was ruptured during delivery. However, the mass was otherwise well encapsulated. A longitudinal incision was made through the posterior peritoneum medial to the mass and the descending colon was retracted to the right. The abdominal aorta and vena cava were identified and it was evident that the blood supply of the mass was through the renal artery. The vessels were ligated and divided. Another high attachment was recognized as the kidney pelvis but was drawn quite thin. It was ligated close to the mass. The mass then shelled out with comparative ease but there was an adhesion to the greater curvature of the stomach. Careful inspection of the stomach at this site did not show an erosion. The colon was just placed back in the cavity left. No attempt was made to suture it down.

Immediately following the removal of the mass a careful search for the left kidney was made unsuccessfully. The right kidney was palpable and about the size of a walnut and apparently not involved. Inspection of the liver, spleen and other abdominal organs showed no pathology. The peritoneum was sewed with a continuous chromic No. 00, the fascia closed with No. 00 silk interrupted, and a continuous dermal for the skin. The postoperative condition was good.

The postoperative period in the hospital was rather uneventful. Blood transfusions were given as indicated. The feedings were from 1 to 2 ounces, and daily lack of fluids was made up by saline glucose by hypodermoclysis. The saline was limited however. Penicillin 10,000 units every three hours was given for five days although not strictly indicated. Vitamin C was given for the first two weeks by hypo and later added to formula. The formula consisted of one third condensed milk, two thirds boiled water with 2 tablespoons of Karo to the daily formula. Homicebrin, 1 teaspoon, and elixir iron sulphate were added to the daily formula. The baby left the hospital on the twentieth day weighing 7 pounds. Its birth weight was 8 pounds 13 ounces. The postoperative weight was one pound less than the preoperative weight.

The pre- and postoperative use of X-ray therapy is a consideration. To use it preoperatively would take a period of weeks. The only hope for cure in these cases is early surgery. Postoperative X-ray treatment is being considered. It is generally agreed that the cases not cured by surgery do poorly from the time of operation. This baby, now 15 weeks old, is making a vigorous recovery. Should it do so for the first year or 18 months it likely will be a cure.

The pathological report made by Dr. Mary Martin is as follows:

Gross: This nodular tissue has been opened widely. It is 9x6x6 cms. The surface is smooth and shiny but nodular. On broad surfaces made by cutting there is no resemblance to kidney. There are nodules of soft grey edematous fleshy tissue, some with recent hemorrhages, others softened and cystic, containing clear fluid. The tumor weighs 239 gms. At one place, in particularly hemorrhagic regions, are calcified portions 4 cms. in diameter.

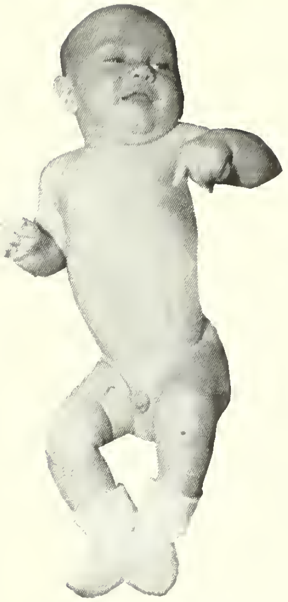

Fig. 3. Taken at 15 weeks of age. Weight 12 lbs., 2 oz. General physical and X-ray examination negative.

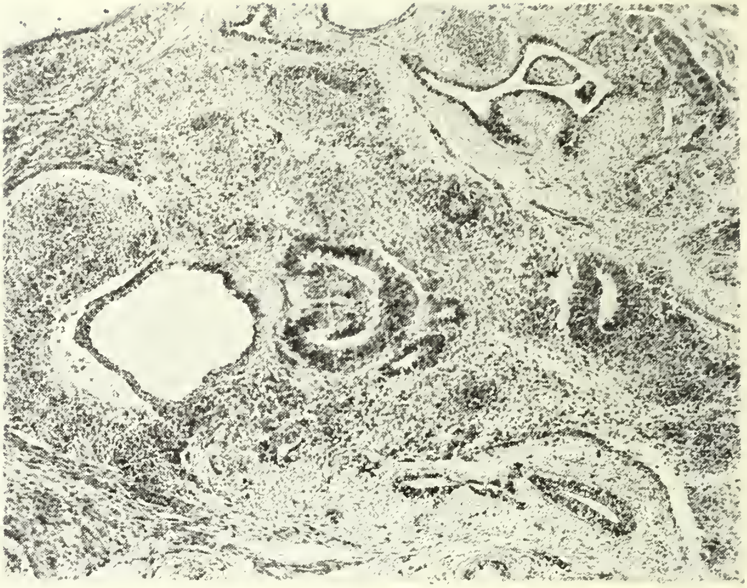

Fig. 4. From this section of the tumor perhaps a designation of teratoma seems more appropriate than embryoma because of the heterogeneity of the cellular elements.

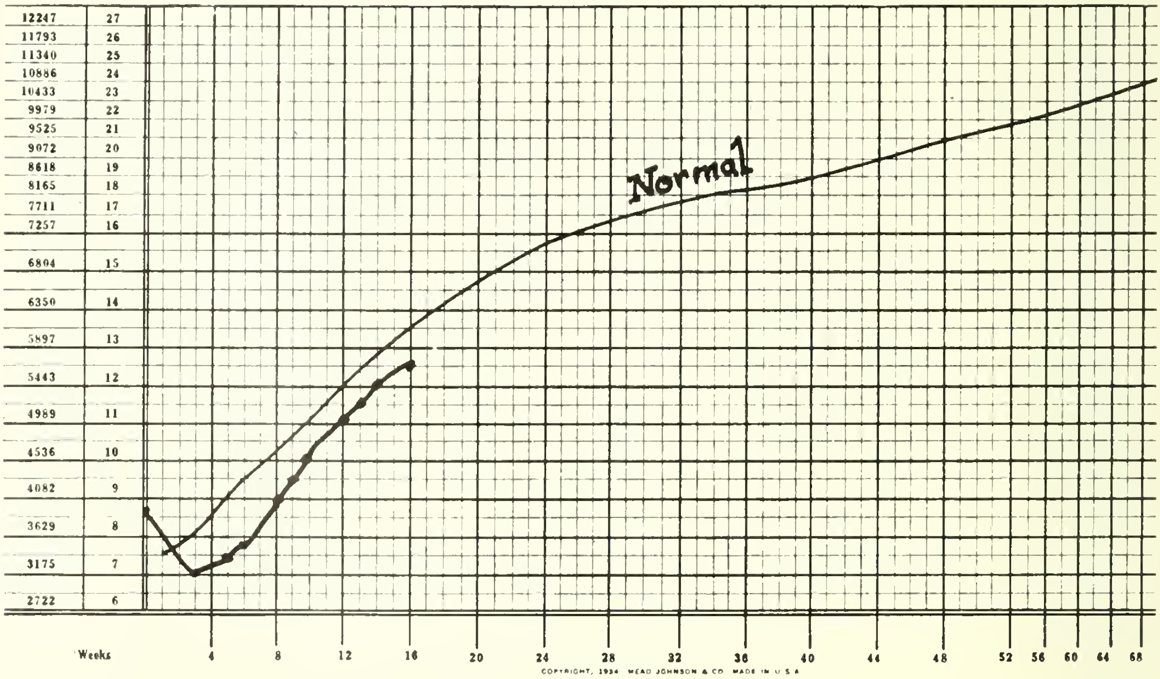

Fig. 5. Weight chart.

Histology: Tissues from many regions of paraffin blocks as well as sections prepared by the freezing method are examined. At all levels are masses of spindle-shapel cells supporting alveolar and tubule-like structure lined by epithelium. These tubules vary in size. Many are small and they are lined by tall columnar, sometimes pseudo-stratified epithelium. Elsewhere larger cyst-like clefts have similar lining cells. In several places are masses of epithelium in small cords separated by sinusoids. Small islands of embryonal cartilage are present. Some of the larger spaces contain granular precipitates. Portions from the calcified regions are being decalcilized and will be examined later. No tissue resembling kidney is present in the sections studied. At one place, tissue histologically like glia can be identified and nearby are cells with the structure of smooth muscle. At several other places smooth muscle tissue is represented also. The tumor has the structure of an embryonal mixed tumor and is unusual in that nervous tissue as well as cartilage, smooth muscle and possibly glandular elements and epithelium are all represented. If the calcified portions prove to have the structure of bone the presence of this element is another unusual feature. The prognosis must be guarded.

Diagnosis: Adenomyosarcoma (embryonal mixed tumor).

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Book Reviews

Cornell Conferences on Therapy, Volume I. Edited by HARRY GOLD. New York: The Macmillan Co. 322 pages, 1946. $3.25.

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This unusual volume consists of the reports of therapeutic conferences conducted at Cornell University from 1937 to the present year and published in the journals of the American Medical Association and New York State Medical Society. A number of problems of treatment not generally discussed in textbooks of medicine or pharmacology are considered. There is an excellent chapter on "The Doctor's Bag" which merits thoughtful reading by anyone who carries one. The book is weighted heavily with discussions of the treatment of heart disease. The chapters on digitalis and the mercurial diuretics are excellent. A number of typographical errors and inane remarks should have been deleted in the reading of the proof. A comment such as, "I have learned a great deal this morning," sounds good in conference but is out of place in print. Conferences cannot be transcribed stenographically to appear in book or article form.

R. B.

Penicillin and Other Antibiotic Agents, by WALLACE E. HERRELL. Philadelphia: W. B. Saunders Co., 1946. 348 pp., 45 illustrations. $5.00.

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Any book on penicillin currently published must suffer the handicap of being "out of date" before it reaches the book stores. Dr. Herrell, Assistant Professor of Medicine of the University of Minnesota and Consultant in Medicine at the Mayo Clinic, definitively summarizes the early history of the development of penicillin and authoritatively gives the status of this drug as of 1945. He has contributed voluminously to the literature on penicillin and related antibiotics. This book is of interest both to the investigator and the clinician. Much attention is given to penicillin, but there are also chapters on streptothricin, streptomycin, and miscellaneous antibiotic agents.

R. B.

The Lung, by WILLIAM SNOW MILLER, Late Emeritus Professor of Anatomy, University of Wisconsin. Second Edition. Cloth. Price, $7.50. Pp. 222, with 168 illustrations.

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This book is the result of 47 years of arduous work on the anatomy of the lungs by William Snow Miller, of the University of Wisconsin. The first edition was published in 1937. Second and third printings were done in 1940 and 1943, respectively. The second edition contains a considerable number of new illustrations and nearly 40 pages of additional text. In fact, there are 168 figures, 22 of which are in color. Unusual attention has been given to all details of manufacturing and design. This book can truly be designated a classic in medical literature. It is not only of great value to the anatomist, but also to physicians and scientists engaged in work which in any way pertains to the lungs.

J.A.M.

Mongolism and Cretinism, by CLEMENS E. BENDA, M.D. New York: Grune & Stratton, 1946. Pp. 310, illustrated. $6.50.

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This is a well written book in which the author has tried to collect all the scientific facts concerning mongolism and cretinism and to interpret the information thereby obtained in such a way that it becomes of value to the student, the practitioner and the investigator. Much good material is offered which makes the reader feel that there soon will be more concrete evidence concerning the etiology of mongolism leading surely to more satisfactory forms of therapy for the treatment of the same condition.

In this connection emphasis is placed on the general pathology of the pituitary and thyroid deficiency. In doing this the author brings up a review of the whole subject of cretinism which is timely because this condition is often missed in the work of the busy doctor. The monograph includes twelve chapters, well arranged, and 103 illustrations. For anyone that must deal if only occasionally with mongolism or cretinism, this publication is highly recommended.

A. V. S.

Rehabilitation, Its Principles and Practice, by JOHN E. DAVIS, M.A., Sc.D. New York: A. S. Barnes and Company, Inc., 1946. 264 pages. $3.00.

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In this book the author discusses the problems of rehabilitation of the physically and mentally ill. He emphasizes the fact that good rehabilitation must be aggressive and aimed away from merely hospitalizing a patient in order to protect society. It must be directed at utilizing the patient's needs, interests, and capacities with the view of returning the individual to society as a functioning component. In order to institute practical rehabilitation the author discusses the importance of correlating the various techniques and approaches developed by the psychologist, psychiatrist, vocational and recreational specialists.

The author's philosophy is certainly plausible and well handled in this book. This volume should be of value to the various groups who should be participating in the rehabilitation of these emotionally ill individuals.

A. B.

The Venous Pulse and Its Graphic Recording, by FRANZ M. GROEDEL, M.D. New York City: Brooklyn Medical Press, 1946. 223 pages. $5.50

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This latest monograph on the venous pulse stresses the diagnostic value of phlebography. The author, in his preface, asks, "How, we may ask, can we complete our knowledge of this circulation if we do not study the venous blood stream with the same interest and eagerness as we do the arterial blood stream?" No one questions the value of the phlebogram in experimental medicine. In clinical practice, however, cardiologists rely on the electrocardiogram to supply most of the information available from phlebography. The author does not demonstrate sufficient additional information for the phlebogram to warrant its application to general clinical use.

R. B.

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Dr. J. C. Shirley
Dr. E. Lee Shrader
Dr. E. J. Simons
Dr. J. H. Simons
Dr. S. A. Slater
Dr. W. P. Smith
Dr. S. E. Sweitzer
Dr. W. H. Thompson
Dr. E. L. Tuohy
Dr. M. B. Visscher
Dr. O. H. Wangensteen
Dr. S. Marx White
Dr. H. M. N. Wynne
Dr. Thomas Ziskin, *Secy.*

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Dr. W. Russell Brown, *President*
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Editorials

HEALTH IS NOT ON THE MARKET

Most people are misled by the term "health insurance." They picture an attractive system, which, for a nominal fee, will eliminate most of the ills the human flesh is heir to. This is responsible for much of the support to schemes for compulsory government "health insurance."

You can buy prepaid hospital and medical care. Throughout the country many excellent volunteer plans to accomplish this are in effect, they are spreading rapidly, and their cost is remarkably low for the services rendered. But you can't buy anything that will guarantee health. The public health is dependent on any number of factors outside the province of doctors and hospitals—sanitation, personal hygiene, accident prevention, nutrition, housing, crime control, working conditions, and family income. No concern, not even the government, can write a policy guaranteeing that all these conditions will be immediately solved.

The government can, of course, force payment in advance for medical services. It can regiment the medical profession and make the doctor dependent on political favor and patronage for his income. This has been tried in England, the Scandinavian countries, and elsewhere, with dubious results. It is certainly true that no nation receives better medical care than ours, under the present voluntary system.

The cheerful words "health insurance" should not be permitted to lead us to an experiment which would end in socialized medicine.

A. E. H.

LOCAL CHAPTERS OF NATIONAL FOUNDATION FOR INFANTILE PARALYSIS AID THE PHYSICIAN

Again during these summer months outbreaks of poliomyelitis are making their appearance in many sections of the country. Last year 25,191 cases occurred in the nation. No one can forecast how many cases will occur this year or how badly the communities in this area will be affected. Medical science, unfortunately, cannot as yet prevent an epidemic or even one case.

Physicians in this area, as well as elsewhere, are aware of the multitude of problems poliomyelitis presents. Treatment of the disease is apt to be prolonged and extremely costly, requiring the services of many specialists. Too often the patient's family looks to the physician for advice and guidance far beyond the immediate problem of medical care.

In times such as these it is helpful to physicians to know that there are others prepared to share these troublesome burdens. In addition to making possible epidemic aid, education, and scientific research, the National Foundation for Infantile Paralysis is pledged to assist financially those patients who require such help. Through their generous contributions to the March of Dimes, the American people have made this possible. Hospital bills, salaries for physical therapists and nurses, purchase of special equipment, and the many other charges which may comprise the essentials of good medical care may be paid for by the Chapters of the National Foundation when necessary. Local Chapters of the National Foundation are scattered throughout the United States. There is one in or near your own community.

Physicians serve on the local Chapter's Medical Advisory Committee, guiding the Chapter in developing medical care programs and solving allied problems. You are urged to cooperate with your National Foundation Chapter. Notify the Chapter when a poliomyelitis patient comes under your supervision. Make certain that the family of your patient knows of the Chapter's existence and willingness to assist. By so doing you will be performing an essential service to your patient and relieving yourself of many unnecessary burdens.

E. J. S.

THE MAYO MEMORIAL — ITS PROGRESS AND ASPIRATIONS

In 1945 the Legislature of Minnesota approved a grant of $750,000 on condition that an equal amount be given privately for the construction of a Mayo Memorial building as a tribute to Doctors William J. and Charles H. Mayo. This building will be the nucleus of a medical center at the University of Minnesota devoted to the search for medical knowledge, the training of physicians, and the care of the sick. To date, the sum of $1,160,000 has been contributed by 3,088 corporations and individuals.

These two funds would have been nearly adequate to construct the building under the original cost estimates. But building costs since the estimates were made have increased about 50 per cent, and this, together with the shortage of labor and of building materials, made it impossible to start construction.

Under the circumstances it seemed wise to re-appraise the plans for the Memorial building. A Chicago firm of architects was engaged to collaborate with C. H. Johnston, of St. Paul, who drew the original plans. After exhaustive study they recommended that, because of economies and added conveniences, the Memorial be enlarged to include the School of Public Health, the Medical Library, and the Cancer Research Institute, funds for all of which are being provided from other sources.

Since this plan would provide a more useful building at no increased net cost (other than the increase in building costs) the Committee of Founders and the Regents of the University approved the recommendations. In April 1947 the Legislature made a second grant of $750,000 conditioned on a like amount being provided from private sources. With about $1,250,000 in private subscriptions in hand, only $250,000 more is needed to match the state grants of $1,500,000 and to meet the revised building cost of $3,000,000.

The existing University Hospitals, Laboratories, and Medical School buildings will be connected with the central Mayo Memorial in such a way as to form a complete medical center virtually under one roof. The funds for most of these connecting buildings are either in hand or in reasonable prospect. The advantages of this close proximity of facilities and services are incalculable. The search for medical knowledge and the training of physicians must go hand in hand with the most enlightened care of the sick.

The Memorial will co-ordinate effectively the superior medical facilities and services now available at the University and will add greatly to them. By making possible extended research in the illnesses prevalent in industry and by maintaining a closer relationship with industrial plants in this area, it will promote industrial health and thereby increase industrial productivity. It will benefit every city and community in the state, and its influence for better health conditions will extend far beyond the borders of Minnesota.

The Committee of Founders is grateful to those who have subscribed most of the funds needed and invites the continued interest and support of corporations and individuals in making the Memorial a reality.

Donald J. Cowling,
Chairman, Committee of Founders

American Student Health Association

Word comes from the Student Health Service of South Dakota State College that Dr. Harold Miller died last fall. Myron C. Tank, M.D., has been appointed to take his place as head of the Department of Student Health.

Marietta College, Marietta, Ohio, has applied for membership in the American Student Health Association. Deane H. Northrup, M.D., is Director of Student Health.

Duquesne University, Pittsburgh, Pennsylvania, has applied for membership in the American Student Health Association. William J. Holt, C.S.Sp., is Director of Student Welfare. Dr. J. W. Macdonald is physician.

Lynn Dodge, M.D., has recently joined the staff of the Department of Student Health at Iowa State College. Dr. Dodge has recently resigned from the Army, in which he held a commission as Lieutenant-Colonel.

COUNCIL MEETING OF AMERICAN STUDENT HEALTH ASSOCIATION, 25TH ANNUAL MEETING, Hotel New Yorker, New York City, May 9, 1947

Left to right (seated): Laurence B. Chenoweth, M.D., University of Cincinnati, Ohio; Ruth M. Collings, M.D., Woman's College of the University of North Carolina, Greensboro, N. C.; Warren E. Forsythe, M.D., University of Michigan, Ann Arbor, Mich.; Ralph I. Canuteson, M.D., University of Kansas, Lawrence, Kan.; George T. Blydenburgh, M.D., Ohio Wesleyan University, Delaware, Ohio; Raymond W. Bradshaw, M.D., Oberlin College, Oberlin, Ohio. (Standing): Charles E. Lyght, M.D., National Tuberculosis Association, New York City; K. Leora McCloskey, M.D., New York University, New York City; Lawrence W. Holden, M.D., University of Colorado, Boulder, Colo.; Max L. Durfee, M.D., Iowa State Teachers College, Cedar Falls, Ia.; Ruth E. Boynton, M.D., University of Minnesota, Minneapolis, Minn.; Dean F. Smiley, M.D., American Medical Association, Chicago, Ill.; E. Lee Shrader, M.D., St. Louis University School of Medicine, St. Louis, Mo.; Walter Batchelder, M.D., University of New Hampshire, Durham, N. H.; John E. Sawhill, M.D., New York University, New York, N. Y.; Harold D. Cramer, M.D., University of Idaho, Moscow, Idaho.

Officers Elected May 7

At the annual meeting of the American Student Health Association, New York City, May 7, the following were elected as officers:

President, Harry D. Lees, M.D., University of Pennsylvania, Philadelphia; vice president, Ruth M. Collings, M.D., Woman's College of the University of North Carolina; re-elected as secretary-treasurer, George T. Blydenburgh, M.D., Ohio Wesleyan University, Delaware, Ohio.

Members of the Council are: John Sundwall, M.D., University of Michigan; Joseph E. Raycroft, M.D., Princeton, New Jersey; Harold S. Diehl, M.D., University of Minnesota; James F. Edwards, M.D., Iowa

State College; Warren E. Forsythe, M.D., University of Michigan; Dean F. Smiley, Lt. Comdr. MC-(S) USNR, Bureau of Medicine and Surgery, U. S. Navy, Washington, D.C.; Raymond W. Bradshaw, M.D., Oberlin College; E. Lee Shrader, M.D., St. Louis University; Charles E. Shepard, M.D., 2002 Tasso Street, Palo Alto, California; Ruth E. Boynton, M.D., University of Minnesota; Joseph P. Ritenour, M.D., Pennsylvania State College; Max L. Durfee, M.D., Iowa State Teachers College; Harold D. Cramer, M.D., University of Idaho; John E. Sawhill, M.D., New York University; Lawrence W. Holden, M.D., University of Colorado; Walter Batchelder, M.D., University of New Hampshire; K. Leora McCloskey, M.D., New York University.

STUDENT HEALTH PRACTICES

The Health Service and Families of Married Students

The wives and children of married students have no rights under our Student Health Service. We do provide sanitary inspection of the temporary student villages built up on the University grounds, and we are providing a visiting nursing service in these villages. The student is responsible for a private physician for the sickness of his wife and children, which I think is right.

These student villages have their own political organizations with town meetings. They elect a council and mayor, and a committee on health and sanitation, and, the Student Health Service advises with this committee at a monthly meeting. I think one of the great gains the student makes during his University stay is this training in citizenship. I feel he should also learn to handle the financial problems of his family, including the care of his family's sickness. Most of the married students are veterans with a government allowance and with their wives working have an income of about $200 a month, which is about the income of an instructor in the University who pays his own way. We advise our married students to take out hospital insurance to cover their hospital expenses.

Dan G. Stine, M.D.,

Director, Student Health Service,
Montana State College,
Bozeman, Montana

Qualifications for Director of a Student Health Service

The qualifications for Director of a Student Health Service are of such a varied nature that it is hard to say with any degree of certainty which are the more important. Perhaps that is not necessary if a few of the essential requirements are listed.

First, then, he or she should be a well-trained, intelligent medical clinician. This does not necessarily, or even perhaps, preferably, mean that a certified specialist is needed. If one is qualified as a specialist, internal medicine would probably be the best preparation for the job. But it is absolutely essential that the director have a broad grasp of the best modern practice, in both diagnosis and treatment, and that he have the respect and cooperation of other members of the medical profession in his community, so that he will be able to obtain easily for his patient the help of the best specialists when such persons are needed for individual students.

In the smaller health services he must do much or perhaps all of the general clinical work himself, while in the larger ones he perhaps will have time only to direct the other physicians in the group. But in either case clinical training, experience, and intelligence are equally necessary.

Second, he should be a good administrator in all that that word implies and in student health work it implies a great deal. Tact, the ability to work cooperatively with members of his staff, with faculty and administrative colleagues, and with students is a very large factor here. The student health service set apart by its functions from other college departments, is at the same time the one department of the college which has to work most closely with many other faculty groups. The administrator, or Dean of Health, as he is sometimes called, must have the ability to build confidence in the student, and among his colleagues of the faculty, that the department is so organized as to give the maximum in health service to the college as a whole.

Administrative ability means too, not only tact, but a practical gift for organization and enough knowledge and interest in finances to be able to manage the fiscal affairs of the department with efficiency. It is often true that the department is one of the largest in the college, if it includes Physical Education and formal classes in Health Education. And, if it does, there is no department with such a wide variety of functions which must be harmoniously conducted for the purpose of bringing the student the best in health information and practice.

Which brings us naturally to the third qualification for a Student Health Director, which is that although he is a good medical clinician, he should have a a real and a primary interest in Education, meaning education as a whole, but first in Health Education. His life is to be spent in an educational institution and if his interest in the instructional side of the college is only casual or secondary he will find himself more and more removed from, and therefore less and less useful, to the college community. And first of all and all the time he must realize that his chief function and his pleasure should be to educate the picked young men and women of our college communities in ways of healthful living which will make them efficient, intelligent members of the larger communities into which they will be graduating.

Ruth M. Collings, M.D.,

Vice President, American Student Health Association

Director, Department of Health,
The Woman's College of the
University of North Carolina

NEWS FROM SOUTH DAKOTA

At the 66th annual meeting of the South Dakota State Medical Association at Rapid City May 31 to June 3, 1947, the following officers were elected: Dr. W. Russell Brown, Watertown, president; Dr. J. L. Calene, Aberdeen, president-elect, and Dr. W. H. Saxton, Huron, vice president. Dr. R. G. Mayer, Aberdeen, continues as secretary-treasurer, and John C. Foster, Sioux Falls, as executive secretary.

The house of delegates set up a committee to study the costs of a first-class medical school located entirely in one center which will be reported to the next session of the legislature. The 1947 legislature abolished the four-year medical school at the state university which had been authorized by the previous legislature. The university school would have included clinical work in Sioux Falls hospitals.

NEWS FROM NORTH DAKOTA

At the 60th annual meeting of the North Dakota State Medical Association at Fargo, May 25, 26, 27, the following officers were elected: Dr. Philip G. Arzt, Jamestown, president; Dr. W. A. Liebeler, Grand Forks, president-elect; Dr. W. A. Wright, Williston, first vice president; Dr. L. W. Larson, Bismarck, second vice president; Dr. O. A. Sedlak, Fargo, secretary; Dr. G. E. Larson, Bismarck, treasurer; Dr. A. P. Nachtwey, Dickinson, speaker of the house; Dr. John H. Moore, Grand Forks, A.M.A. delegate; Dr. C. W. Toomey, Devils Lake, continues as alternate A.M.A. delegate.

At a meeting in conjunction with the North Dakota State Medical Association convention a women's auxiliary was organized with Mrs. Philip G. Arzt, Jamestown, as president. President-elect is Mrs. W. F. Baillie, Fargo; first vice president, Mrs. H. M. Berg, Bismarck; second vice president, Mrs. Theo. Keller, Rugby; recording secretary, Mrs. O. M. Smith, Killdeer; treasurer, Mrs. V. G. Borland, Fargo. One-year appointments of councillors list Mrs. A. D. McCannel, Minot, Fourth district, and Mrs. W. H. Gilsdorf, Valley City, Fifth district. Two-year appointments: Mrs. J. H. Mahoney, Devils Lake, Second district; Mrs. V. D. Ferguson, Edgeley, Eighth district, and Mrs. R. W. Rodgers, Dickinson, Tenth district. Three-year appointments: Mrs. R. D. Weible, Fargo, First district; Mrs. A. A. Kjelland, Hatton, Third district, and Mrs. R. H. Breslin, Mandan, Sixth district. Other district officers are to be named later.

The North Dakota Academy of Ophthalmology and Otolaryngology elected Dr. L. H. Reichert, Dickinson, as its new president, Dr. George Foster, Fargo, vice president, and Dr. M. T. Lampert, Minot, secretary.

The North Dakota Society of Obstetricians and Gynecologists elected Dr. G. Wilson Hunter of Fargo president; Dr. G. H. Wheeler, Mandan, vice president; Dr. F. D. DeCesare, Fargo, secretary-treasurer, and Dr. R. W. Rodgers, Dickinson, to the board of governors.

North Dakota Health Officers Association, meeting in Fargo, May 26th, heard addresses by Drs. A. B. Price, United States Public Health Service, District No. 7, Kansas City, Missouri; L. W. Landry, Walhalla, President of the North Dakota Health Officers Association, and R. O. Saxvik, Acting State Health Officer. Dr. A. B. Price discussed the problems and scope of the Mental Hygiene Program. Dr. H. W. Miller, Casselton, was elected President and Dr. T. Q. Benson, Grand Forks, was elected Vice President. Both of these elections were carried by unanimous vote.

The North Dakota Radiological Society, also meeting in Fargo in connection with the State Association, heard Dr. Harry Weber with a section on roentgenology at the Mayo Clinic. Dr. Weber appeared both on the State Association Scientific Program and at a luncheon sponsored by the Radiological Society. The following are the officers of this Society: Dr. H. M. Berg, Bismarck, President; Dr. P. H. Woutat, Grand Forks, Vice President; Dr. C. O. Heilman, Fargo, Secretary-Treasurer.

NEWS FROM MONTANA

Dr. John F. Lhotka of Butte has been re-elected councillor of the medical chapter of the alumni association of Loyola university, Chicago, a post which he has held for many years.

Dr. H. L. Casebeer, Butte, was elected president of the Butte Chamber of Commerce for the ensuing year.

Dr. Elna Howard, Miles City, was attending physician at the birth of quadruplets on June 14. This was reported as one of the most unusual Father's day presentations in the nation. Dr. Howard stated that the three girls and a boy weighed a total of 11 pounds, 6 ounces.

The annual meeting of the Montana State Medical Association, held June 26, 27, 28 at Missoula will be reported in a later issue of JOURNAL-LANCET.

The medical advisory board of the Montana department of the American Legion, of which Dr. Thomas L. Hawkins of Helena is state director, met May 22 with officials of the Fort Harrison veterans' hospital. In addition to Dr. Hawkins, members of the board are Dr. Edwin S. Murphy of Missoula, Dr. Richard R. Chapple of Billings, Dr. Joseph R. Moran of Butte and Dr. A. Jack Terrill of Great Falls. Drs. Moran and Terrill are dentists.

It was the first meeting of the new advisory board and was called so the Montana board could talk over the purposes of the national Legion's medical advisory board program as applied to Montana.

Dr. Alan Gold of Butte, who recently attended a meeting of the American College of Physicians, has qualified for a certificate as a specialist in internal medicine from the American Board of Internal Medicine.

Dr. E. H. Lindstrom was elected president of the Lewis and Clark County Medical society at an election session held May 23. He succeeds Dr. E. L. Gallivan, retiring president. Others elected to official positions in the county society were Dr. James J. McCabe, vice president, and Dr. Amos R. Little, secretary-treasurer, succeeding Dr. Lindstrom and Dr. Robert M. Campbell. Delegates to the annual meeting of the Montana Medical association in Missoula in late June were also selected at the meeting. First, second and third delegates are

Dr. R. Wynne Morris, Dr. Otto G. Klein and Dr. Claude M. Mears. Alternates are Dr. McElwee of Townsend, Dr. David T. Berg and Dr. T. W. Cooney.

NEWS FROM MINNESOTA

Dr. Maurice B. Visscher, University of Minnesota scientist, will head a 10-man United Nations medical research team scheduled to tour Hungary and Austria this summer. The party is made up of 2 Swiss and 8 American doctors, including Dr. John J. Bittner, professor of cancer biology at the University of Minnesota and president of the American Association for Cancer Research. The project has been organized for the U. N. Health unit by the Unitarian Service committee, Boston, to promote international exchange of medical and scientific knowledge.

Members of an advisory council on mental health appointed by Governor Luther Youngdahl to assist in establishing a state policy in meeting problems concerning mental health and mental institutions in Minnesota are: Drs. F. J. Braceland and Philip Hersema of the Mayo Clinic, Rochester; Drs. S. A. Challman and Alexander Dumas of Minneapolis; Drs. W. P. Gardner and E. M. Hammes of St. Paul; Dr. L. R. Gowan of Duluth; Dr. Donald W. Hastings of the University of Minnesota, and Frank Rarig of Wilder Charities, St. Paul.

The first annual dinner of the American College of Physicians and Surgeons, a Minnesota-born society with membership limited to general practitioners, took place in Duluth, June 29, with Dr. F. G. Benn of Minneapolis, president of the Minnesota chapter, among the speakers.

Dr. A. J. Chesley, executive officer of the Minnesota department of health, was awarded a scroll signifying honorary life membership in the American Social Hygiene association by Dr. Gaylord Anderson, director of the university school of public health. The award was made on the basis of Dr. Chesley's work during the 45 years he has been associated with the health department.

Tent 12, Variety Club of the Northwest, including Minnesota, the Dakotas and part of Wisconsin, has been given the national award for outstanding charitable work among all Variety clubs in the nation. The honor was given Tent 12 because of its work in raising more than $300,000 for erection of a Heart hospital at University of Minnesota, according to A. W. Anderson, chairman of the Variety Heart Hospital committee.

DEATHS

Dr. J. E. Hetherington, 62, physician for more than 30 years in Grand Forks, North Dakota, died May 9.

Dr. William Davis, 93, St. Paul, Minnesota, died May 9. He had practiced in St. Paul for 56 years until his retirement in 1939.

Drs. Frank Muccilli, 29, and Albert Muccilli, 26, Duluth, Minnesota, were drowned in a boating accident on May 15.

Dr. R. E. Walker, 70, St. Paul, Minnesota, physician and surgeon, died May 27.

Dr. Harry A. Brandes, 59, former president of the North Dakota Medical association, 1939-40, died recently at Bismarck. He also served as president of the North Dakota War Chest during World War II.

Dr. Fred L. Andrews, 68, retired Great Falls, Montana, physician and surgeon, died April 18. He was one of the founders of the Medical Arts building in Great Falls.

Dr. A. C. Knight, 66, physician and surgeon in Philipsburg, Montana, for 28 years, died May 5. He was formerly assistant physician at the Montana state hospital, assistant superintendent of the state insane hospital and later superintendent.

. . . MEET OUR CONTRIBUTORS . . .

Walter A. Fansler, M.D., has practiced in Minneapolis for 32 years; is clinical professor of surgery, University of Minnesota; associate surgeon in charge of Proctology, Minneapolis General Hospital; staff member, Minnesota General, Abbott, Northwestern, St. Mary's hospitals; graduate, University of Missouri, A.B., A.M., Johns Hopkins University, M.D., 1914; member, Hennepin County Medical Society, Minnesota State Medical, A.M.A., American College of Surgeons, American Proctologic Society (Past President); Diplomate, American Board of Surgery (Proctology).

Harry R. McPhee, M.D., has been athletic physician, Princeton University, since 1933; associate professor of Health and Physical Education and with the Students' Health Service, Princeton University, since 1928; graduate, Western Reserve university, 1924, B.A., M.D.

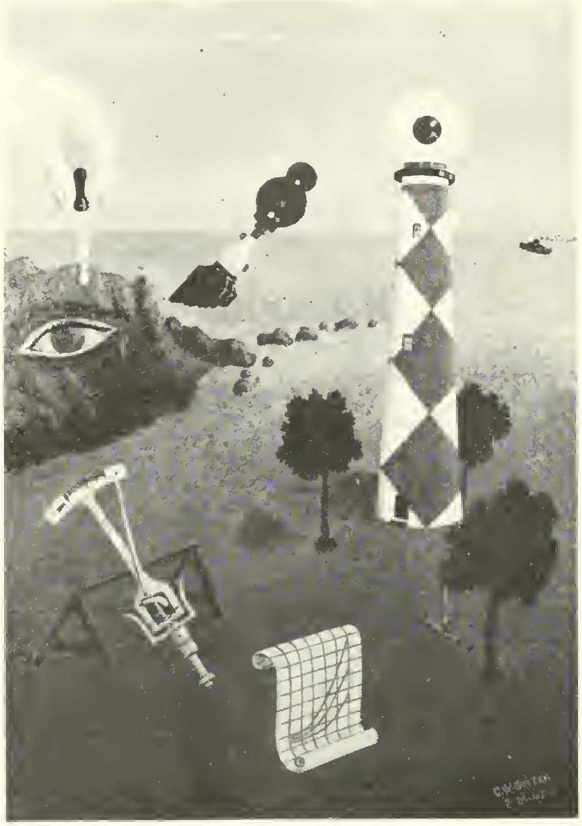
H. Archibald Nissen, M.D., has practiced in Boston, Massachusetts, for 28 years; specializes in arthritis and allied ailments; staff member, New England Deaconess Hospital; graduate, University of South Dakota, A.B., 1911, Harvard University, M.D., 1916, Harvard Graduate School, Philosophy and Psychology, 1911-12; member, A.M.A., Massachusetts Medical Society, American Rheumatism Association, Boston Orthopedic Club, Association for Study of Internal Secretions, American Society for Research in Psychosomatic Problems; Fellow, Royal Society of Medicine (England).

Ramona L. Todd, M.D., has been with the Students' Health Service, University of Minnesota, for 6 years; graduate, University of Minnesota, 1941, B.A., M.S., Ph.D., M.D.; member, Hennepin County Medical Society, Minnesota Medical Society, Sigma Xi, and Research Committee, American Student Health Association.

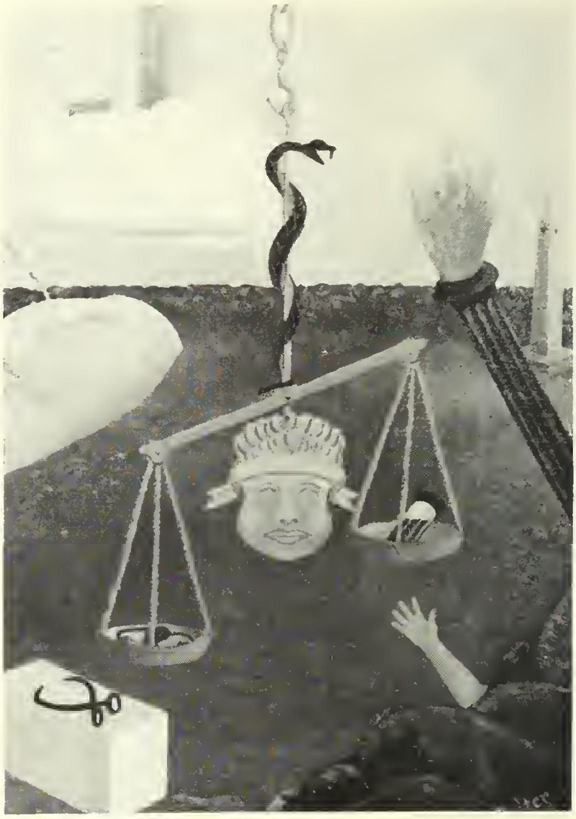
Richard E. Brogan, M.D., is in practice with his brother, Horace Brogan, in Billings, Montana; graduate, Creighton Medical School, M.D., 1931; interneship, St. Anthony's Hospital, Terre Haute, Indiana; past prison surgeon, Montana State Prison; mine surgeon, Roundup, Montana; member, Yellowstone County Medical Society, Montana State Medical Association.

SURREALIST ART OUT OF STEARNS

Through the courtesy of Maurice F. Moore, chairman of the medicinal division of the American Chemical Society and assistant director of research for Frederick Stearns & Company, Detroit, we are privileged to show a surrealist's conception of glaucoma and the same painter's conception of the menopause. Both canvases are the work of Dr. Clyde W. Geiter, associate medical director and industrial physician at Stearns'.



GLAUCOMA
By C. W. Geiter, M.D.
Assistant Medical Director, Frederick Stearns & Co.
Detroit, Michigan



MENOPAUSE
By C. W. Geiter, M.D.
Assistant Medical Director, Frederick Stearns & Co.
Detroit, Michigan

Advertisers' Announcements

BERROCA C — FOR PARENTERAL B-COMPLEX THERAPY

Hoffmann-La Roche, Inc., of Nutley, New Jersey, recently announced to the medical profession a clear, *stable* solution of five essential B-complex factors plus vitamin C for parenteral administration. The ampuls are ready for immediate use. Since the amount of niacinamide is within the bounds of average clinical needs, there is very little likelihood of hot flushes or other side reactions. The presence of vitamin C is a significant advantage since conditions causing B-complex deficiency often affect vitamin C balance as well. By administering Berocca-C, the physician can thus rapidly replenish all the important water-soluble vitamins in which his patients are likely to be deficient. Berocca-C is given by subcutaneous or intramuscular injection; when given intramuscularly, however, it may produce temporary pain. Berocca-C can also be given intravenously provided it is diluted at least 20 times. It is therefore particularly useful for addition to parenteral nutritional fluids. Berocca-C is available in 2-cc. ampuls, boxes of 6, 25 and 100. Descriptive literature and samples will be furnished upon request.

U. S. VITAMIN ISSUES NEW RUTIN TABLETS

U. S. Vitamin Corporation, of New York, N. Y., has just made available to the medical and allied professions Rutin, a nontoxic drug derived from buckwheat. Rutin has shown dramatic possibilities in the treatment of conditions characterized by capillary fragility and hemorrhage. Clinical investigations in such serious conditions as hypertension, diabetic retinus, and hemorrhagic telangiectasia have demonstrated the ability of Rutin to favorably increase capillary resistance, and to prevent or minimize hemorrhagic tendencies and vascular crises.

One group of clinicians normalized capillary resistance in eight out of twelve patients showing excessive capillary fragility following administration of Rutin for several months. They believe the drug to be particularly useful in hemorrhagic dyscrasias and hypertension with abnormal capillary permeability. Other investigators employed Rutin successfully not only in overcoming increased capillary fragility in a majority of hypertension patients, but also achieved good prophylactic results against bleeding among high blood pressure patients receiving thiocyanate therapy concommitantly. In highly resistant hemorrhagic telangiectasia, Rutin arrested bleeding within 24 hours after several transfusions had failed.

Rutin (U. S. Vitamin) is so extracted and purified as to be of uniform therapeutic potency, and is supplied as tablets, 20 mg. to each, bottles of 100. U. S. Vitamin Corp., 250 East 43rd Street, New York 17, N. Y., invites the profession to send for literature.

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during the first days of life . .

HIGHLY ACTIVE VITAMIN K COMPOUND

Since newborn infants "show a decrease in prothrombin . . . from the second to the fifth day of life,"[1] the administration of vitamin K "has a definite place in the prevention of neonatal hemorrhage."[1] A single dose of Synkayvite 'Roche', the water-soluble, stable, non-toxic vitamin K-compound, "will not only raise the prothrombin time to about normal in one day but will also prevent the fall in prothrombin during the first week."[2] Many obstetricians have therefore adopted the use of Synkayvite* as a routine measure in all deliveries. Available in 5-mg tablets and 5-mg and 10-mg ampuls.

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*Reg. U. S. Pat. Off. Synkayvite is the tetrasodium salt of the diphosphoric acid ester of 2-methyl-1,4-naphthohydroquinone. 1. A. Webster and J. E. Fitzgerald, S. Clin. North America, 23:85, 1943. 2. H. Dam, J.-Lancet, 63:353, 1943.

Synkayvite 'Roche'

STETHETRON MAKES HEART-BEATS SOUND LIKE MOTOR

A new electronic stethescope called the Stethetron, has been developed in the electronic laboratories of the Maico Company, Inc., Minneapolis. It enables a doctor to amplify body sounds to a point where the slightest murmur in the wrong place can be detected. The Stethetron is recognized as one of the foremost achievements in the field of medical electronics. Not only does it greatly amplify body sounds, but it possesses the quality of selective amplification. The principle of inverted tonal emphasis, instead of eliminating certain tones altogether, subdues them to convenient comparison levels. A simple dial on the Stethetron makes it possible to tune out frequencies which are not desired, and another dial controls the amplification of the desired sounds.

The Maico Company, Inc., has long identified itself by ethical advertising. That company's Atomeer, one of the first single unit hearing instruments, has now been proven by more than a year of successful service in the field and has more than fulfilled Maico's high requirements and standards.

BORDEN AWARDS

Nine American scientists received Borden Awards of a gold medal and $1,000 for outstanding contributions to scientific research during 1946. This brings to 55 the total number of awards made since their establishment in 1936. The awards are designed to recognize and encourage outstanding research achievements. They are administered by eight professional and scientific associations. Two of the associations and the 1946 recipients are: The American Dairy Science Association—Ezra P. Reineke, Michigan State College, born Waseca, Minnesota, graduate of University of Minnesota, for major research in milk secretion, and American Institute of Nutrition—Genevieve Stearns, College of Medicine, State University of Iowa, born Zumbrota, Minnesota, graduate of Carleton College, Northfield, Minnesota, for major research in the nutrition of infants and children.

Robert A. Good, 3201 Clinton Ave. S., and Donald Sutherland, 2502 Elliot Ave. S., Minneapolis, received the award for outstanding medical research by undergraduates at the University of Minnesota. Good, now interning at General hospital, was chosen for work on virus encephalitis for half the $500 award and the other half was given to Sutherland for a study of blood pigment metabolism.

NEW INTESTINAL SULFONAMIDE

"Sulfathalidine" phthalylsulfathiazole, the new nontoxic, smaller dosage intestinal sulfonamide, has been accepted by the Council on Pharmacy and Chemistry of the American Medical Association, according to a recent announcement by the Council.

Developed by the Medical Research Division of Sharp & Dohme, Inc., Philadelphia, "Sulfathalidine" is an intestinal bacteriostatic agent. Clinically nontoxic, the drug maintains a high concentration in the intestinal tract where its bacteriostatic action markedly alters the bacterial flora. An average of only 5 per cent of the ingested drug is absorbed from the bowel, and a sulfonamide blood level of over 2 mg. per 100 cc. of blood is rarely observed.

"Sulfathalidine" is being widely used in the treatment of ulcerative colitis, regional ileitis, and as an adjunct to intestinal surgery.

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List of 20 authoritative diets, typewriter facsimile, with printed letterhead. Specimen and details on request. Write P. S. Meyers, 152 Van Houten Ave., Passaic, N. J.

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Aznoe's, established in 1896, has available a number of well trained physicians (diplomates of the specialty boards, industrial physicians and surgeons, general practitioners, psychiatrists, tuberculosis specialists and residents). For histories, write Ann Woodward, Aznoe's-Woodward Medical Personnel Bureau, 30 North Michigan Ave., Chicago 2, Ill.

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The JOURNAL LANCET

Minneapolis, Minnesota
August, 1947

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New Series

Cancer Control in Montana

Eugene Hildebrand, M.D.
Great Falls, Montana

The Cancer Committee of the Montana State Medical Association, composed of eight physicians,* has cooperated closely with the Montana Division of the American Cancer Society to further cancer control in Montana. The work of the physicians has been greatly simplified due to the excellent cooperation of Mrs. H. W. Peterson. The Montana Division of the American Cancer Society has recently incorporated. The constitution and by-laws emphasize the maintenance of strong state control of the Society by physicians; this has been carried out. A physician is President of the Board of Directors and another physician is Chairman of the Executive Committee. Mrs. H. W. Peterson has been named Executive Vice-President of the Board of Directors, and, with this new title, continues her excellent work of lay education and service.

During the year four major projects were undertaken: (1) the reporting of cancer cases; (2) an enlarged lay education program; (3) a physician education program; and (4) an indigent patient service program.

Reporting of Cancer Cases

A cancer report form was designed. This form is brief but includes data necessary to the proper conduct of statistical cancer research. Each physician in the state received a pad of ten of these blanks together with a letter explaining the reporting of cancer cases and asking for his cooperation. In this letter it was explained that very little information is available regarding cancer in Montana, aside from the actual number of deaths. It was further explained that a regulation of the State Board of Health requires the reporting of cancer cases. The State Board of Health in Helena has the administrative set-up to take care of the register, and so it has been established there under the direction of Dr. B. K. Kilbourne, who is a member of the Cancer Committee.

CANCER REPORT FORM
Date
Name of Patient .... Age .... Sex
Marital Status .... If female: Para .... Gravida
Address .... Occupation (Please be specific)
Nationality (or extraction) .... Family cancer history?
Onset of symptoms (approximate date)
Date first consulted physician ....
Principal symptoms .... Physical findings?
Diagnosis (Please be specific) .... Date
Confirmed by microscopic study? ....
Metastases present? ....
Type of treatment administered? (If X-ray or radium, please state amount) Date .... If referred for treatment, name and address of physician to whom referred? ....
Remarks ....
Physician's Signature

The purpose of this register is to study cancer as it occurs in Montana. We wish to determine, if possible, the actual incidence, influencing factors, and the effectiveness of the present treatment. In this latter regard, physicians reporting cancer cases will be contacted for follow-ups on their patients. A simple form has been designed for this follow-up study. The patients themselves will not be contacted directly. The physicians were asked to report cases by name to prevent duplica-

CANCER FOLLOW-UP FORM
Date ....
Name .... Date first reported ....
Address ....
Physician .... Diagnosis ....
To be filled in by Reporting Physician
General Health of patient? .... Recurrence ....
Metastases? .... Treatment Summary ....
Physician's Signature
(Please note if address of patient has changed)

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*W. F. Cashmore, C. H. Fredrickson, H. V. Gibson, E. L. Hall, E. Hildebrand, B. K. Kilbourne, R. F. Peterson, and W. C. Robinson.

tion and to allow a cross-check with death certificates to be carried out. The file is a confidential one, and is available for research only.

It is felt that an analysis of the cases of cancer reported will benefit Montana physicians and their patients on a long term basis. The effectiveness of the various types of treatment can be compared. The results can be evaluated and correlated with those obtained elsewhere. The possible influence of factors such as race, heredity, age, and occupation may be analyzed. An important factor not usually considered in such a research program is noting the efficacy of the lay educational program. If an increase in the number of early cases is noted by the physicians, we can be fairly certain that the lay educational program is having a beneficial effect.

The reporting of cancer cases has been approved by the legal counsel of the Montana State Medical Association.

LAY EDUCATION PROGRAM

Lay education continues to be the major objective of the American Cancer Society. Mrs. Peterson reports that many physicians throughout the state have been especially helpful during the past year in various phases of the lay program. They have appeared on scores of radio programs and have graciously accepted many speaking engagements. The educational program has been extended in the public schools and much instruction has been given to youth generally. A very successful essay contest was conducted.

Much cancer literature has been put up in the form of kits. These kits are of two general types. One is known as the "club kit." This kit is so designed that program chairmen of lay organizations can put on an entire program using this kit as the basis of the program. The second type is the "library kit" which is now present in all of the public libraries of the state and is available for lay reading. Great credit is due to Mrs. Peterson in the design of these kits. They have attracted nation-wide attention and many states have profited by her idea.

Approximately 100,000 bookmarks imprinted with the danger signals of cancer have been distributed by libraries. Three authentic books for lay readers have been presented to every public library in the state. Educational materials were effectively displayed at all Montana fairs during the last year and thousands of pamphlets were distributed in this way, mainly to rural people.

One radio station in Montana sponsors a regular weekly broadcast period dedicated to health. An occasional period is given over entirely to cancer. Guest speakers from accredited health agencies are welcome on this program provided their scripts are approved by the local medical society prior to the broadcast date. This broadcast series is proving very popular and has a large listening audience.

Another community has developed lay educational material in the form of dramatic skits. These have been presented to lay audiences together with informative talks by local physicians. Likewise, two educational cancer skits have been broadcast over this community's radio station. Another phase of the educational program is the showing of many 16 mm. sound movies which are rotating through the schools of the state. Fifteen hundred lay men and women throughout the state are today actively aligned with the American Cancer Society and are actively working to disseminate the educational material. This lay education program is designed to tell the people of Montana to consult their physicians early when any sign or symptom of cancer is noted and to seek periodical examinations.

PHYSICIAN EDUCATION PROGRAM

As physicians we are constantly in search of additional knowledge so that we may better treat our patients. Much new knowledge about cancer has come to the fore in the last decade. In order to make this new knowledge a part of every physician's armamentarium, the Cancer Committee of the State Medical Society, acting with the financial aid of the Cancer Society, decided on three courses of action:

1. Secure an out-of-state speaker of distinction to make a tour of the state presenting papers on cancer.
2. Pay the expenses of physicians to refresher courses on malignant diseases.
3. Set up a physicians' loan library.

In the first instance, Dr. Frank B. Queen, Professor of Pathology, Oregon University Medical School, and director of cancer control in the state of Oregon, was secured to tour the state. He presented papers in Missoula, Butte, Billings, Glendive, Glasgow, Malta, Great Falls, and Helena. All of these talks were well received. It is estimated, conservatively, that Dr. Queen talked to more than 60 per cent of the Montana physicians during this trip. He also addressed lay audiences at each stop, furthering the lay education program.

Secondly, each County Medical Society has been contacted and asked to select, by lot or otherwise, two physicians to attend refresher courses. (Expenses to be paid by the Montana Division of the American Cancer Society.) One of these courses was the Rocky Mountain Cancer Conference at Denver, Colorado, on July 9 and 10. The other will be a formal course at the Oregon University Medical School in Portland, Oregon, of four days duration, in the latter part of September. All but two County Societies have replied, and of those who replied, all are participating in this program. The physicians attending the meetings have been requested to make reports to their respective county societies upon their return, thus furthering the educational program.

A free loan library was established. Unusual medical volumes are thus made available to the physicians of the state. These books can be borrowed by mail from the office of the Montana Division of the American Cancer Society, 505 Lewis Avenue, Billings, Montana.

The Riddle of Cancer—OBERLING.
Textbook of Pathology—MOORE.
Cancer Handbook—LILJENCRANTZ.
Cancer in Childhood—DARGEON.
Leukemia and Allied Disorders—FORKNER.
Carcinoma of the Lungs—SIMONS.
Cancer of the Face and Mouth—BLAIR, MOORE & BYARS.
Lymph Node Metastases—TAYLOR & NATHANSON.
Diseases of the Breast—GESCHIKTER.
Diagnosis of Uterine Cancer by Vaginal Smear—PAPANICO-

laou & Traut.
Cancer of the Colon and Rectum—Rankin & Graham.
Occupational Tumors & Allied Diseases—Hueper.
Atlas of Ovarian Tumors—Barzilai.
Neoplastic Diseases—Ewing.
Gynecological & Obstetrical Pathology—Novak.
Autopsy Diagnosis and Technique—Saphir.
Post Mortem Appearances—Ross.

Patient Service Program

The Field Army workers of the Montana Division of the American Cancer Society have long felt the need for an active service program to care for medically indigent patients suffering from cancer. A service program was designed by the Executive Committee of the Montana Division of the American Cancer Society. This program is not meant to replace existing agencies which aid medically indigent patients, but is meant to supplement the service available from these agencies. The program is administered in each instance by the family physician. Thus the entire program is ours, as physicians, to control. The success or failure of the program is also our responsibility. A letter was sent to each physician in the state setting forth these ideas and enclosing a service form. The first page of this form sets forth the principles on which the program is based. On the second page is a list of instructions which tells the physician how the program operates. It is basically as follows:

The patient, through the family physician, requests aid. This aid may be in the form of outright subsidization or in the form of an interest-free loan. The patient fills in his portion of the blank. The physician then takes the blank, adds his diagnosis and recommendations, and sends the blank to the Montana Division of the American Cancer Society, 505 Lewis Avenue, Billings, Montana. Upon receipt of this request, investigation of the financial status of the patient is undertaken through disinterested third parties. The results are recorded on the third page of the form. Cancer is considered a semi-emergency, and the investigations are made very rapidly, usually in less than twenty-four hours. If the patient is found to be medically indigent, the service is authorized. Upon completion of the hospitalization and treatment, the hospital renders its statement and the physician renders his. The authorization for professional services on this form states "a reasonable fee will be paid for the diagnosis of suspected malignancy, and/or the surgical, X-ray, or radium treatment of a patient suffering from a malignant tumor direct to the physician." The Cancer Committee of the State Medical Society feels that Montana physicians are fair and reasonable in their charges. This has proven to be true.

PATIENT SERVICE PROGRAM

In order to do the most good with the limited funds available, the Executive Committee of the Montana Division of the American Cancer Society has set forth the following policies:

1. Funds may be expended for the diagnosis of suspected cancer, and/or for the surgical, X-ray, or radium treatment of a patient suffering from a malignant tumor. Funds will not be expended outside the state of Montana except in unusual cases.
2. Interest-free loans will be available for patients who would be markedly financially embarrassed were they to pay for proper care in a lump sum. Outright subsidization of the cost of diagnosis or treatment will be limited to medically indigent patients. These funds are available only to patients not qualifying for adequate assistance from other established sources.
3. Funds are available only as follows: (a) *Professional Services.* A reasonable fee will be paid for the diagnosis of suspected malignancy, and/or the surgical, X-ray or radium treatment of a patient suffering from a malignant tumor. (b) *Hospital Expenses.* The sum authorized is to be used for a ward bed only, routine nursing care, and minimum hospital special services for a maximum period of 14 days. (c) *Out-patient Expenses.* An allowance of $2.00 per day will be made for the maintenance of patients who are away from home while undergoing ambulatory treatment for a malignant tumor. (d) *Tissue Examinations.* Tissue examinations should be requested on the "Biopsy Request" sheet. The pathologists will be paid directly by the Society. All tissue removed from a patient must be examined by a qualified pathologist or no funds will be disbursed under this Patient Service Program.
4. Limitations as to the funds available for the type of treatment and/or hospitalization requested must, of necessity, be at the discretion of the Executive Committee. No funds will be available for transportation of any kind.
5. In each instance the credit rating and financial status of the patient will be investigated by an impartial and disinterested third party before the expenditure of funds will be authorized.
6. Authorization for the expenditure of funds (see page 3 of this form) must be obtained before funds will be disbursed by the Society.
7. Funds will be disbursed, in properly authorized cases, upon receipt of an itemized statement within one month of the completion of treatment and/or hospitalization.

Another part of the service program is the biopsy service. The pathologists of Montana render diagnoses to the physicians submitting biopsies from indigent patients. They receive a fee for their services direct from the Society. A biopsy request form was designed and sent out to every physician in the state together with a letter outlining the service.

PATIENT SERVICE PROGRAM
BIOPSY REQUEST

Date
Name Sex Age
Single Married Widowed Divorced
Address (Occupation (specific)
Nationality or Extraction Race
I hereby certify that I am unable to pay for this service.
Patient's Signature

Below to be filled in by Physician

History (relative to problem) Serology?
If female: L. M. P. Type cycle
Family cancer history?
Physical findings (relative to problem)
Previous therapy of this condition?
Operation and findings Clinical Diagnosis?
Physician's Signature and Address

It is understood that this request will be honored by Montana pathologists only.

This form, together with the tissue to be examined, may be sent to any one of the Montana pathologists.

Below to be filled in by Pathologist

Pathologic Diagnosis
Opinion as to radiosensitivity
Remarks
Pathologist's Signature

The overall service program has been designed to aid the medically indigent cancer patient in obtaining adequate medical care. It should be emphasized that the service program is not meant to supplant existing agencies aiding medically indigent patients; it supplements this aid. Likewise, it should be emphasized that impartial credit exchanges and the welfare agencies investigate each case. No funds are distributed unless the financial status of the patient is in the bracket which meets with the approval of the Cancer Committee of the State Medical Association.

The House of Delegates of the Montana State Medical Association, in session on June 27, 1947, approved the following recommendations of the Cancer Committee:

1. A continuation of the reporting of cancer cases and a detailed analysis of the reported cases of cancer, to try to ascertain statistical data of value to the physicians of Montana and to their patients.
2. An extension of the lay education program in cooperation with the Montana Division of the American Cancer Society.
3. A continuation and augmentation of the physician education program through: (a) greater numbers of local meetings with papers on cancer by local and out-of-state physicians; (b) refresher courses, provided the present courses are deemed of value.
4. A continuation of the medically indigent patient service program as outlined.

Copies of the forms outlined in this article may be obtained from the author.

Advances in Medicine in World War II

Jan H. Tillisch, M.D.* and Wallace A. Merritt, M.D.*
Rochester, Minnesota

WORLD WAR I brought forth comparatively few new things that could be termed true lasting advances in medicine. The chief advance was the increased parenteral use of fluids. The increased use of intravenous administration of solution of acacia and physiologic saline solution and the increased use of transfusions all directly resulted from World War I. With these exceptions, the war added little to medical knowledge. It is possible that what are deemed significant medical advances resulting from World War II may be found to be of slight value in future years. At this time, shortly after World War II, several very real and valuable medical advances appear to have resulted from the war.

Among these advances are the increased use of blood substitutes, especially plasma, and the use of transfusions of large amounts of blood. Dried plasma has been used frequently when blood was not readily available. It provides a reserve which may be stored for use in an emergency. The refinements in the methods of preparing blood plasma and the recognition of its limitations and indications have resulted from its use in World War II. The advantages of the plasma as emphasized by Whitby[1] are that no blood grouping test is required, it does not produce or precipitate any of the intragroup Rhesus factor complications, and it is nonperishable and may be stored for several years. The limitations of plasma and all available blood substitutes are that they are not complete substitutes for blood. The increased use of transfusions of large amounts of blood has been a direct outgrowth of the war. Hess and Sutton,[2] in reporting their experiences in the field, pointed out that the blood requirements of their patients ranged from 500 cc. to 10.5 liters. They emphasized the importance of administering a sufficient amount of blood to restore the blood picture to normal. The criteria for normality of the blood are the hematocrit reading, the value for the hemoglobin and the concentration of plasma protein.

The widespread incidence of rheumatic fever in the armed forces led to investigation of this disease. The opportunity to study rheumatic fever on a large scale emphasized the relation between hemolytic streptococcic infections and rheumatic fever. Holbrook,[3] and Holbrook and van Ravenswaay [4] reported that widespread use of sulfonamides for the prophylaxis of infectious processes due to hemolytic streptococci materially reduced the incidence of rheumatic fever.

The specific indications for the use of sulfonamide prophylaxis in the Army Air Forces were as follows: (1) the presence of epidemics of acute respiratory disease, (2) a previous history of rheumatic fever and a prevalence of acute respiratory disease and (3) prior to any operation on the ear, nose or throat. Sulfadiazine is the drug of choice and is administered in doses of 0.5 to 1.0 gm. daily. The prophylactic administration of this drug should not be continued for more than three weeks. If there is not a material drop in the rate of respiratory infections at the end of this period, the presence of a sulfonamide-resistant organism should be suspected. The only advance in treatment of rheumatic fever resulting from the large war-time experience in the disease is the realization of the value of removing, as soon as feasible, patients with rheumatic fever to areas of low incidence of the disease to reduce the likelihood of recurrence.

In the first two years of World War II the high incidence of primary atypical pneumonia led to a better knowledge and increased recognition of this disease. Atypical pneumonia is not a new disease or even a newly discovered old disease. Under various names it has been recognized for many years. A recent study of pathologic specimens which were in the Army Medical Museum and were obtained in three cases of pneumonitis which occurred in the Civil War showed the pathologic picture of atypical pneumonia. This not only is of interest but also emphasizes that atypical pneumonia is not a new disease. There are several reasons for the sudden prominence given atypical pneumonia. Epidemics in recent years have called attention to it. The increased use of roentgenograms of the thorax has resulted in the diagnosis of atypical pneumonia in many cases in which the diagnosis would be missed ordinarily. The use of sulfonamide compounds has pointed out that there are types of pneumonia that differ from the ordinary pneumococci pneumonia in that they do not respond to administration of sulfonamides.

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*Division of Medicine, Mayo Clinic, Rochester, Minnesota.

The cause of primary atypical pneumonia is not known. A virus has been suspected as the cause and there are several factors that bear out such a belief. There are numerous known virus diseases which have produced a pulmonary picture that closely resembles that of atypical pneumonia. A picture practically identical with that of atypical pneumonia has been observed in cases of psittacosis. In a few cases of atypical pneumonia an infectious agent has been obtained that will produce illness and pulmonary lesions in mice and ferrets for a few passages.

Atypical pneumonia occurs both endemically and epidemically, and is transmitted by prolonged contact. It is presumably an air-borne infectious process. It may be possible to have a mild form of the infection without pulmonary involvement. The incubation period is from seven to twenty-one days.

Probably the most characteristic clinical feature of the disease is the late development of physical signs in the lungs, which is in contrast with the comparatively extensive roentgenographic evidence of the lesion. The onset of the disease is usually gradual. Prodromal symptoms usually occur. They include nonproductive cough, low-grade fever, muscular aching, malaise, headache and sore throat. The dry cough is the most common early symptom. Cyanosis or other evidences of respiratory embarrassment rarely occur. They occur only in cases in which the disease is very severe. Frequently the patient does not appear as ill as he feels. Early in the course of the disease, the results of physical examination may be entirely negative.

The leukocyte count is normal but leukopenia occurs occasionally. The sedimentation rate of the erythrocytes is elevated and frequently is used as an index of the progress of the disease. Roentgenographic examination of the thorax is the most important laboratory procedure in the diagnosis of the disease. In the majority of cases the lesion is basilar. The chief distinguishing roentgenologic feature of the disease is that the lesion is not as dense as the lesion in cases of pneumococcic pneumonia.

The disease is usually very mild. Malaise and fatigue are prominent symptoms and may persist for several weeks after the acute stage has subsided. Complications are not common. Pleural effusion, residual bronchitis, bronchiectasis and pulmonary abscess are occasionally seen as complications.

The treatment of atypical pneumonia is entirely symptomatic and supportive. Sulfonamides and penicillin are of no value in the treatment and should not be prescribed if a definite diagnosis of atypical pneumonia has been made.

Infectious hepatitis is not a new disease. It has been present in epidemic forms in many wars and it is not an uncommon disease among the civilian population in peacetime. It, therefore, may seem surprising that when one of the medical officers of the Reichswehr was questioned concerning wartime advances in medicine he stated that an increase in the knowledge of infectious hepatitis was one of the most significant advances. The import of this statement is borne out by the fact that in World War II infectious hepatitis was one of the most important illnesses in the military services. Because of the prevalence of the disease an opportunity was afforded to investigate it extensively. Generally there were two stages in the disease, a prodromal or preicteric, and an icteric stage. The preicteric stage occurred in the majority of cases. It was characterized by lassitude, fatigue, and a moderate elevation of temperature, usually not over 103° F. Frequently nausea and anorexia also occurred. This stage would last from one to fourteen days. Occasionally the patient apparently would completely recover for a few days before the icteric stage would develop. The severity of the icterus varies greatly from a subclinical icterus to an intense generalized bronze pigmentation. During this period the liver becomes enlarged and tender, and the gastro-intestinal symptoms of nausea and abdominal discomfort are marked. The average duration of the jaundice is from two to four weeks, although it may be present for three months or more. Barker, Capps and Allen,[5] in their study of the disease, found a significant number of cases of infectious hepatitis in which jaundice was not present. In these cases the disease ran a shorter and milder course than it did in the cases in which jaundice was present.

The Hanger cephalin cholesterol flocculation test and the bromsulfalein test of liver function are of diagnostic value in the preicteric stage. The bromsulfalein test and determination of the value for the serum bilirubin are of value in determining the course of the disease in its later stages. The other tests of liver function are frequently valuable adjuncts in the diagnosis and in following the course of the disease.

The treatment of infectious hepatitis is early and adequate rest and proper diet. Early complete rest in bed will decrease the severity and shorten the duration of the disease. A diet high in protein and carbohydrate and low in fat has been found to be of value in the treatment of the disease. Choline and methionine have been tried in the treatment of infectious hepatitis because of their lipotropic properties. Their effectiveness has not been determined at this time.

In the convalescent period of the disease the patient should not be allowed out of bed until the liver is of normal size and no longer tender, until the value for the serum bilirubin has returned to almost normal, and until all symptoms of the disease have disappeared. His return to full activity should be gradual and any evidence of recurrence should necessitate promptly putting the patient to bed. Excessive amounts of vitamins, especially vitamin B, are not indicated. The fluid intake should be adequate but should not be more than 3,500 cc. per day.

Because it was apparent early in the war that American troops would be stationed in areas where the incidence of malaria is high, it was necessary to carry out intensive studies on drugs which might be suppressive or even prophylactic. The result was one of the best coordinated and most extensive studies yet made on a single disease. While the suppressive drug, quinacrine (atabrine) was available before the war, it was demonstrated conclusively that the administration of 0.1 gm. of quinacrine daily produced a high degree of suppression of malaria caused by Plasmodium vivax and a prophylactic effect against infections produced by Plasmodium falciparum. The results of treatment of clinical malaria with quinacrine proved to be superior to those obtained with quinine, and quinacrine produced far fewer acute toxic reactions. In a remarkable study of about 14,000 chemical compounds for their antimalarial activity it was found that chloroquine, or 7 chloro-4-(4-diethylamino-1-methylbutylamino) quinoline, was an effective suppressive drug when administered no more frequently than once weekly in a well tolerated dose. Chloroquine is also a highly effective and safe antimalarial drug which is superior to quinine and quinacrine in the treatment of acute attacks of malaria caused by Plasmodium vivax.

To one who has treated any number of patients who have had one of the richettsial diseases, it soon becomes apparent that the available therapeutic agents produce only symptomatic relief. As a result of research by the United States of America Typhus Commission, it has become apparent that this group of diseases is favorably affected by para-aminobenzoic acid. Clinical trials with this drug in cases of louse-borne typhus fever by Yeomans and co-workers,[6] in cases of Rocky Mountain spotted fever by Rose and associates [7] and in cases of tsutsugamuchi fever by Tierney [8] have yielded encouraging results. It is apparent that this group of related diseases is amenable to treatment with chemotherapeutic agents which should result in a lowering of the morbidity and mortality rates. An initial dose of 8 gm. of para-aminobenzoic acid followed by 3 gm. every two hours results in a concentration of 30 to 60 mg. of the drug per 100 cc. of blood within two days. The addition of sodium bicarbonate reduces gastric irritation.

Important advances were made in the prevention of disease during the war, and one of the most interesting of these advances was the use of tetanus toxoid in the Army. In the middle of 1941, the medical corps began immunization of all personnel with tetanus toxoid, and as a result there were recorded but three instances of tetanus among immunized personnel.

Although cutaneous diphtheria has been recognized as an entity for a long time, its importance became more apparent during the war and especially so in tropical climates. The term "cutaneous diphtheria" should be used to designate any lesion of the skin from which Corynebacterium diphtheriae of proved virulence can be recovered. The infection may occur in any type of preexisting lesion but usually produces a deep, rounded, punched-out ulcer. The base may be clean or may have a gray or gray-green fibrinopurulent base. Generalized symptoms are usually absent but in a few cases complications such as neuritis similar to the Guillain-Barré syndrome, or myocarditis may occur. Diagnosis depends on cultural studies and determinations of the virulence. These procedures should be carried out in cases in which chronic ulcers of the skin are resistant to usual forms of therapy. Treatment consists of local cleansing and the administration of appropriate amounts of diphtheria antitoxin. Cutaneous diphtheria may occur as a penile ulcer.

Recently Francis and co-workers [9] presented evidence that subcutaneous vaccination with inactivated influenza virus types A and B exerts a striking protective effect against epidemic influenza B.

The shortened convalescence due to increased physical activity of the patient during this period has been a noteworthy achievement in World War II. Dock [10] and Ghormley[11] have emphasized the dangers of prolonged rest in bed in medical and surgical cases. Rest in bed is known to promote thrombosis and embolism, lowering of pulmonary efficiency, pulmonary collapse and atrophy of the muscles and bone. Rusk[12] has demonstrated the value of physical exercises and mental activity at an early stage of the convalescence. The period of hospitalization has been shortened, and the patient has been returned to full activity in a much better condition than the patient who has not taken part in such a rehabilitation program. The essential features of such a program are physical reconditioning and educational retraining. In a physical reconditioning program, the patient participates in a systematic, graduated series of calisthenics and corrective exercises. This treatment is started at the earliest possible moment and the activity is increased gradually. Educational retraining keeps the patient's mind from becoming stagnant and serves to stimulate his mental and physical processes.

SUMMARY

The advances in medicine in World War II have not been related so much to the specific therapy of disease as they have been to an increase in the knowledge of various diseases prevalent in World War II. It has again been emphasized that study under controlled conditions of large groups of cases of an individual disease will afford the greatest familiarity with that disease and thus result in improvement in treatment.

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X-Ray Technic for the Practitioner

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In many instances, the physician whose practice demands the owning of X-ray equipment and the use of X-ray examinations in his office is responsible for the technical quality of the X-ray films produced. He is either required to conduct the examination himself or has to supervise his office nurse, technician, or assistant who, in many cases, has not had the opportunity to gain wide experience in the field of radiography. It has been noted that the quality of the X-ray films produced in these circumstances often leaves much to be desired. This statement is made knowing that little is mentioned about film quality in the usually available medical literature, this aspect of roentgenology being considered as belonging to X-ray technicians. While many physicians have a good working command of roentgenology to suit their types of practice, it takes a considerable amount of experience to be able to evaluate an X-ray film solely from the technical standpoint. Since roentgenology is a young branch of medicine, it has not been possible to include equivalent information along technical lines in the medical schools' curricula that is given, let us say, to the purely technical aspects of surgery, where every graduate is well informed about the basic principles of sterilization, preparation of the surgical field and choice of instruments and materials to aid in conducting the surgical side of his practice.

The physical and chemical laws governing the exposure and processing of radiographs are not very complex, yet few physicians have taken the time to familiarize themselves with the fundamentals of radiography. Good film quality is the basis of good diagnostic roentgenology. With the increasing use of diagnostic roentgenology, the technical aspect of this field of medicine is very important but often neglected. We shall attempt to discuss certain sources of difficulty encountered in the production of satisfactory X-ray films and certain trends in radiography.

Dark Room Procedure[1]

In consultation practice the greatest single film defect seen is *underdevelopment,* often coupled with *over-exposure.* The reason for underdevelopment is simply that the films have not been left in the developer long enough, or that the solutions are too old or too cold. The chief cause for this source of poor film quality is the general belief that once an X-ray machine has been installed and the directions for operation have been followed, the rest of the procedure takes care of itself. This is certainly not true, for dark room technic is generally minimized in importance or grossly neglected. If the technician, and this often is the doctor himself, who is required to process the exposed films, would only realize that the most precise part of making a good radiograph occurs in the dark room, and that the laws governing the development and fixation of an exposed film are infinitely more exact than the numerous variables used in the actual exposure, film quality would be greatly improved.

While it is true that in places where few examinations are made, an adequate technic is never really established radiographically, and the method of "giving some kind of an exposure" and later "watching the film come up" and "pulling the film" may give a diagnostic radiograph, it is just this type of work that results in our greatest and most widely seen film defect, a film that is overexposed and underdeveloped. In modern roentgenology, the only possible excuse for "pulling a film" is in cases where only the grossest sort of information is needed, in cases of emergency or where an anesthetic would be prolonged by waiting for full processing of X-ray films. To resort to the method otherwise harks back to the dark ages of the evolution of roentgenology.

X-ray developing solution is oxidized quite rapidly on exposure to air. Deterioration occurs whether the solutions are used or not. To combat this, the use of tank covers with rubber gaskets around the edges should be used or other means of combatting oxidation tried, such as the use of floating covers or floating sheets of wax paper laid on the solution, particularly if the amount of work is limited. The level of the solutions should be maintained by commercially available replenishers.

A simple test of full or adequate development of a film can be made by inserting a finger between the finished film and the viewing light in an area on the film not covered by the patient, such as the region just above the shoulder in a chest film which ordinarily is black. If the development is adequate, the finger outline should not be visible, or only poorly seen. We often see films in which it is possible to read print through these areas which should ordinarily be fully blackened. The test for exhaustion of a developing solution is this lack of blackening in the peripheral areas, assuming that the exposure has been reasonably well conducted. Correction factors for time to compensate for exhaustion by use are available and if the time exceeds seven minutes at the recommended normal temperature, it is probably wise to discard the developer. The supplier can give information about exhaustion by age alone, this may be two or three months or a reasonable length of time.

Since the developer is alkaline and the fixer is acid, it is obvious that there should be adequate rinsing between the two solutions. Fixation should be about as long again as the time required to "clear", that is, about twice as long as the time needed for the unreduced silver to separate from the film. When it takes four times as long for a film to "clear" as it did when the "hypo" was fresh, then the solution should be replaced. Some institutions routinely use a "short stop bath" of dilute acetic acid to preserve the "hypo" and to hasten hardening. The final washing is important also and the length of time recommended by the manufacturer of films and chemicals should be followed implicitly, that being about 15 to 30 minutes, depending on various factors.

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It seems ridiculous to mention the use of a tank thermometer, except that in many doctors' offices no thermometer is used. An accurate temperature control is necessary. Automatic devices are available for this purpose, probably not justified where work is limited in amount. Dairy thermometers should not be used since they are often hard to read and not as accurate in the photographic range. It must be remembered that at ordinary temperatures a chemical reaction will take only half as long to be completed if the temperature is raised ten degrees and twice as long if a corresponding drop occurs. The time-temperature method of dark room procedure should always be followed except as mentioned and the "pulling of a film" otherwise condemned. If a film is so badly exposed that full development renders its density beyond the diagnostic range, the resulting radiograph will be poor anyway if it prematurely "pulled" and will lack the desired quality. One rarely gets into difficulty with overdevelopment, and it is far better to repeat the examination in certain cases than to depend on over-exposed and underdeveloped films, especially in certain examinations. It must be remembered that in roentgenology the doctor is not selling X-ray films but a diagnosis based on good film quality.

Other dark room errors arising during development and fixation include light fog, loss of detail due to "flowing" of the emulsion in hot solutions, "reticulation" of the emulsion, "contact" defects where two films are adherent during the processing and a host of miscellaneous errors in which the emulsion is altered chemically or mechanically which are discussed in the standard works on radiography.

After an installation has been made and has functioned for some time, it may be noticed that "something is wrong with the films." While investigation shows the source of trouble to be in the dark room, the machine or technical chart is blamed for this in most instances. This final step in the production of a good X-ray film is very important and processing should be carefully done at all times.

Equipment

X-ray equipment varies as to type and capacity. While it is true that the capacity of a machine limits the film quality in some examinations, one should not assume a defeatist attitude in those cases where a smaller machine is used. We repeatedly see work done in the home with bedside equipment by a good technician which equals the film quality seen with the larger machines. In buying equipment it should be remembered that break-downs are inevitable and that the availability of repair service should be considered in the choice of a machine.

X-Ray Tubes

One of the first things an X-ray technician does when he begins to work with a machine that is not familiar to him is to study the capacity of the X-ray tube. The capacity is determined by the size of the focal spot, among other things, and the detail in turn is affected by the focal spot size. Tubes now generally have two focal spots. The rotating anode tubes have been in use for over a decade and represent the combination of high capacity with small focal spots and are used to best advantage with the larger types of machines.

The tube rating chart which is supplied with each tube should be posted conspicuously in the X-ray room and freely consulted. Too often tubes are used inefficiently or overloaded if the rating chart is not consulted, particularly when deviations from the standard radiographic chart are made. If a tube is used for fluoroscopy, the rating chart should be consulted since there are great variations in heat capacity of tubes, and fluoroscopy taxes a tube much more than routine radiography.

Accessories

Cassettes and screens. Many physicians who "do a little X-ray work" do not realize that X-ray cassettes and screens are expendable materials. Film defects arising from faulty screens and cassettes rank second to dark room errors seen generally. These vary from gross acquired imperfections, such as marks produced by chemicals and poor contact, to simple dust and dirt in the cassettes. Dirt can be removed by brushing or by washing them with bland soap and allowing them to dry for several hours with the covers left open. Periodic inspections of screens should be made. Areas of poor contact result in localized detail loss in the films and occur most often with the larger cassettes. Corrections and replacements should be made by reliable dealers. "Bargain" screens and cassettes should be avoided since it is very difficult to detect flaws by inspection alone. The speed of screens varies radiographically. If it is not possible to standardize on this matter, differences in speed should be recognized and proper allowance made in the use of the particular set of screens and cassettes by placing a note on the hinged cover, such as "20 per cent more time should be used with this cassette," or equivalent information.

Cones and diaphragms. The use of cones is often neglected. A cone limits the size of the field examined and diminishes "secondary radiation." It is a "must" in certain examinations. We often see gallbladder films where a cone properly used could have changed an indeterminate diagnosis into a definite one. A useful type of cone is the so-called "extension cone" illustrated in Figure 1. In full extension it is useful about the head and neck at short distances; in the intermediate position it can be applied to cholecystography; when fully closed

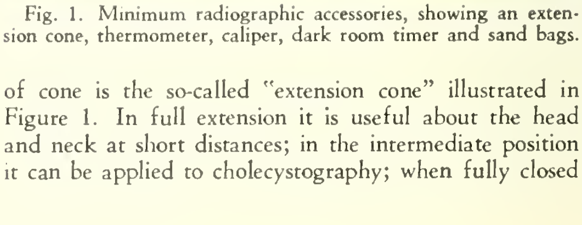

Fig. 1. Minimum radiographic accessories, showing an extension cone, thermometer, caliper, dark room timer and sand bags.

it is adaptable for spine or skull radiography. Cones are essential items that can be transferred from one machine to another and last a long time.

Immobilization devices. In the days when exposure times were longer than at the present, radiographers had to resort to all possible help, and immobilizing devices were generally used. With the increased speed of equipment and film, sand bags, binders and other holding devices seem to have lost their popularity in certain installations. In order to obtain the best diagnostic detail in any film, motion should be minimized. Small fracture lines, small gallstones and similar lesions can be lost in the haze produced by even slight motion. Sandbags of various configurations should be used freely about the extremities and can be home-made as illustrated in Figure 1. Immobilizing belts should be used in the examinations of the abdomen, the spine, the skull, and in urography. Technicians of great experience and ability would not think of making certain examinations without the use of the immobilizing belt, but too often this simple device is not used and the examination is compromised.

Measuring calipers. In order to follow the manufacturers' charts for radiography, accurate measurement of the part examined is necessary. A caliper for this is usually provided and shown in Figure 1. A standard method of measuring should be used. In the chest, for example, the measurement should be made at the same level in all patients and in the same phase of respiration.

Miscellaneous accessories. Numerous "gadgets" are available for use with radiographic equipment, some of which may complicate a procedure to the point of diminishing returns. One should strive to use the simpler inexpensive devices such as sawdust bags for props, large corks for the same purpose, bolsters or pillows for the comfort of the patient, rulers and pointers for calculating angles and distances, and similar fundamental radiographic tools instead of special accessories used only rarely.

We have been introduced to an accessory which deserves special mention and which is finding wide use by many capable X-ray operators. This is known as the "Reed X-ray Technic Computer."[2] It is a slide-rule type of instrument incorporating the relationships of the variables used in medical radiography and integrates these factors with various standard examinations. The relationships of all of the exposure factors routinely involved, milliampere-seconds, kilovoltage, distance, and so forth, are given and the device can be used routinely or when circumstances demand changes or deviations from the standard technic chart available. The computer will lead to better films and can be obtained through most dealers in X-ray supplies, or directly from its formulator.

Trends in Radiography

Extremity examinations. Prior to the introduction of intensifying radiographic screens, all examinations were made by reproducing the actual roentgen image on a photographic emulsion by the direct use of the roentgen ray. By the use of screens in cassettes, exposure times have been decreased advantageously, the momentary fluorescence produced by the screens during an exposure contributes to the major portion of the blackening of the film. It is the feeling of some radiologists that by reverting to the use of non-screen or no-screen technic where the film is exposed in a cardboard folder, increased detail and information not obtainable by the other method is to be had. This is particularly true in the examination of extremities measuring less than 10 or 12 centimeters in thickness. Special film for this purpose is made and is ideal. We have, however, been using "regular" film in folders and have found the results very satisfactory. The exposure time or current value must be increased from 5 or 10 milliampere-seconds as used with screens and cassettes to something on the order of 40 or 50 milliampere-seconds, depending on other factors used. This technic can also be used in heavier parts, such as the knee or shoulder by using the folder with the Bucky diaphragm.

The first examination of an injured extremity should be such that all of the involved bone or portion of the extremity is visualized. Often in the lower leg, attention is focussed on the obvious lower third fracture in the tibia, and the fibular neck fracture, which is present when displacement of the tibial fracture occurs, is missed. This perhaps is of minimal importance as far as the final result is concerned, however, missing a radial neck fracture in connection with a distal ulnar fracture may later be significant. The routine use of oblique views about the wrist is suggested to visualize fractures of the carpal navicular (scaphoid) bone, which may be isolated or may be present with other fractures about the wrist. In observing the progress of those fractures where externally visible callus does not occur, such as the intracapsular hip fractures, utmost attention to detail of radiography should be given in order to bring out information used in the evaluation of the case.

While we concern ourselves with the obvious in most cases, it probably should be recalled that when a lesion is small or in its incipiency, the difference between the normal and abnormal is slight. A case presenting good clinical evidence of a fracture, in spite of negative X-ray findings, should always be re-examined in a week if symptoms persist, in order to demonstrate so-called "occult" fractures. These present themselves only after a time interval by a reactive zone of rarefaction, or periosteal new bone, or hemorrhage.

Spine. Since many compensation and industrial cases center about the spine, and since backache is a common symptom, examination of the spine is often indicated. A proper examination of the spine challenges the skill of the radiographer. Too often, positioning in the lateral views of the lower spine is such that a true projection is not obtained. Exposures have to be long in the lateral views and may tax the equipment unduly if improperly made. Since the spine is at an appreciable distance from the film in this view, distortion will take place and detail will be diminished. The finest possible focal spot should be selected, yet the milliampere-second values needed with the high kilovoltage values and long target-film distance required, may exceed the tube capacity limit. By the use of careful immobilization and cones and interpolation of technical factors, satisfactory films are possible with even the smaller machines. If a machine is calibrated to operate at, let us say, 30 milliamperes on the "small spot," some patients will require exposure times and kilovoltage settings far in excess of the safe limits. It will be noted that by reducing the milliampere value and increasing the time, no danger to the tube will be encountered, and if the patient is comfortably and adequately immobilized, the added time will be of no great significance as far as possible motion is concerned. The ingenuity of the technician in obtaining good films of the lumbosacral region is very important if apparently minor but significant lesions, such as those seen in prespondylolisthesis, are to be demonstrated.

In the upper thoracic spine a true lateral is not generally possible because of the overlying shoulder girdle, and a slightly oblique view is needed. The demonstration of the odontoid process should be routine in the examination of the cervical spine and obtained by exposure through the open mouth or by other methods given in the standard works on radiography.

Chest. Speed of exposure is important in chest examinations. With the smaller units, exposure times can be cut down by diminishing the distance. While it is true that the heart outline suffers distortion at distances less than five or six feet, the distortion is not significant, particularly if the interpretation of the film is made with the knowledge of the distance used.

The density of the initial or routine chest film will vary with the demands of the individual interpreter. Generally, it is desirable to see the faint outlines of the vertebral bodies in the upper half of the thorax but not in the lower half. Some examiners prefer slightly greater penetration in order to suspect retrocardiac lesions, and this can be done if the film has sufficient latitude so as not to "burn out" the "softer" lesions. The initial chest film has to be augmented by lateral and oblique views of various degrees of penetration in the study of the nature of the numerous conditions which may occur.

The value of a chest film taken under any circumstance may become very great in the evaluation of any lesions which may subsequently be studied. Comparisons of exisitng pathologic conditions for possible change in serial films influence and enable diagnoses to be made. A chest film taken and considered to be negative may later be shown to have significant information on it in retrospect when a parenchymal or mediastinal lesion becomes obviously manifest. Previous films are very important to the disposition of a chest case, either surgical or medical, and are of obvious medical and economic importance to the patient.

Gastro-intestinal examinations. We cannot concern ourselves in this presentation with the question of how much fluoroscopy of the gastro-intestinal tract should be done by the average doctor. Certain trends are manifest; the hourly radiography of the course of the barium meal is now a thing of the past as a routine procedure, the so-called retention or 6-hour film is only rarely indicated. Fluoroscopy is being aided by spot-film devices and filming fluoroscopes which enable films to be made of the stomach or bowel during fluoroscopy, with optimum compression and projections not possible in the subsequent radiographic examinations. Adequate preliminary cleansing of the colon, preferably by castor oil in two ounce doses, makes the examination easier for the doctor and the patient and obviously increases the diagnostic value. Speed is important in the filming of the stomach and bowel; if Bucky films are desired, they should be made on the newer "high speed Bucky diaphragms." The use of a Bucky diaphragm should be omitted in the smaller installations where the prolonged exposure invites loss of detail due to motion of the part examined.

Cholecystography. With the exception of certain critical examinations about the head and chest, no examination demands as much careful attention to technic as does cholecystography. The examination is aimed at reproducing a satisfactory image of the gallbladder, preferably in the contracted state, and to visualize possible stones or other lesions of the viscus. Less attention is being paid to the ritual use of the 14, 16 and ½ hour *post cibal* films than to the obtaining of satisfactory gas-free cholecystograms in various projections, including the upright projection. Unless a gallstone is definitely characteristic it should be identified in two or more films, preferably in two projections, since gas shadows and other rarefactions or densities may be taken for gallstones. Pitressin, enemas, and unusual projections should be used in cholecystography if the most is to be obtained from this examination, the value of which, in good hands, cannot be underestimated.

Urography. "Routine filming" at stated intervals in excretion urography is of less value than the individualization of each examination and careful confirmation or exclusion of possible abnormal densities by methods similar to the aforementioned in the search for urinary calculi. Lesions should be identified in several films to be diagnosed accurately. Preparations should include preliminary dehydration, if possible, for 18 hours, and the limits of the excretion method known if used.

Other examinations. In the examination of the skull, routine positions should be adhered to. A true anteroposterior view of the skull is of limited value; the occipital view is preferred, together with a posteroanterior view, as a part of the routine minimal skull examination, the latter to include films from all sides except in the gross exclusion of a skull fracture where the condition of the patient contraindicates much manipulation. Automobile and farm accidents often involve the facial bones which are not shown in the routine type of skull examination and special views, such as the Waters' view for the maxilla, should be employed. Examinations involving the instillation of opaque media, such as lipiodol into body cavities, should always be conducted under fluoroscopic guidance instead of blindly. The contraindications to the use of fluoroscopy in early pregnancy should be recalled, and the use of extensive examinations and preliminary preparation of patients who are pregnant should be discouraged.

The physician who assumes responsibility for radiography in his office should have available standard works on the subject. Two excellent contributions in this field have been made in the past few years, one by Files[3] and the other in a War Department Manual.[4]

Generalities Regarding Film Quality

The relationships of the various factors used in radiography are very complex and adequate discussion is not possible in this type of presentation. In order to analyze a given X-ray film critically for its good or bad points, one should be familiar with such terms as "radiographic detail," "density," "contrast" and "latitude." *Detail* refers to the sharpness of outline, or the resolving power given in the film. It is affected by motion, the size of the focal spot, the tube-film distance, the character of the screens and the distance of the part examined from the film. *Density* refers to the degree of blackness of the film and the amount of photographic effect produced. Differences in density form the basis of diagnostic roentgenology. Generally speaking, the number of milliampere-seconds used in an exposure determines the density; this, however, is a simple definition since the actual amount of X-ray energy reaching the film is the deciding factor, and kilovoltage thus becomes involved in the matter of density. *Contrast* is present in a film if the film has predominantly tones of "black black" and "white white" in it as viewed. Contrarily, a film of that type is said to lack *latitude* in that it transmits few intermediate gray tones. A film is said to have latitude if there are numerous subtle gradations of transmitted light from black to white with many intermediate grays. It is obvious then that with the variation in density of the various body tissues examined, the film possessing much latitude is more desirable than that having much contrast. To illustrate, it is possible to produce a film of a bone which is no more than a shadowgraph showing the white outlines of the bone, without obvious soft tissue markings or evidence of trabeculation in the bone. This is the type of film produced very early in the development of roentgenology, and is of limited value.

The mere lack of contrast does not mean that a film has latitude. A film which has been underdeveloped will lack contrast but will also lack latitude, in that the tones embraced will involve only a small segment of the "gray scale." Often, to the untrained eye, a contrasty film is said to be "prettier", but because of the lack of latitude will be of less value from a diagnostic standpoint.

To illustrate the progress made both by the demands of the roentgenologists and by the film manufacturers, one need only to recall that fifteen years ago it was not common to visualize the placenta with ordinary methods; now it makes its appearance on routine films in most instances, due chiefly to increase in latitude. Likewise, soft tissue lesions about the joints, such as effusions, can be visualized in films having sufficient latitude.

A detailed discussion of the foregoing can be had in a publication[5] of the Eastman Kodak Company, available to physicians. Photographers have long been familiar with the aforementioned terms. Physicians should cultivate the habit of critically analyzing the radiographic quality of their X-ray films in order to improve them. Terms can be used which have been introduced, such as "flat", "smoky", "lacking in detail", and so forth, and the underlying cause determined. It is only by amplifying such phrases as, "this film is smoky in appearance," to "this film is smoky in appearance because of excessive kilovoltage used with the recommended milliampere-second value," that improvement can be made. It is difficult to define in simple terms a film combining the optimum detail, density and latitude except to state that the film has a lot of "snap" or "sparkle" to it.

It is no reflection on the person using roentgenology in his practice whose film quality is substandard because the matter of film quality has not received sufficient attention and has been taken for granted, with the result that many doctors who have acquired considerable ability in film interpretation do not consciously recognize why a given film is good or bad.

Summary

Acknowledging the fact that the doctor who uses X-ray equipment in his office is responsible either directly or indirectly for the character of the radiographs produced, a few suggestions have been made to improve film quality, and some trends in radiography discussed. The physician who otherwise has developed considerable diagnostic acumen in film interpertation for his practice is encouraged to cultivate a critical attitude regarding the purely technical aspects of each film in order to familiarize himself with the factors which contribute to better radiography and hence to better serve his practice.

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Dr. Roland G. Mayer, *Secretary-Treasurer*

Editorials

VIRTUE OF LINIMENTS

Most people have confidence in liniments. There is something mysterious about them. Heaven help the pharmacist whose refills do not measure up to the patient's memory of the color, consistency and smell by which he identifies its conformity to the first dispensation that did so much good.

A liniment is a pharmacopeial preparation, consisting of a medicament in oil, alcohol or water applied by friction to the skin. If the volatile ingredients lack that pristine splendor that characterized the contents of the original container, confidence is lost forthwith, and this usually through absence of olfactory appeal held to be synonymous with unadulterated potency and therapeutic value. The physician who prescribes an odorless rubefaceant may be scientifically right but he could well afford to enhance the value of the preparation by resorting to the art of psychological appeal. We submit that ammonia, camphor, turpentine or wintergreen applied locally may have some beneficial effects. We agree that in cases where time and *vis medicatrix naturae* are the only requirements both patient and friends are happier if they are given "something to do." We still believe, however, that the chief virtue of liniment is the accompanying massage that would not be carried out if the application were colorless, odorless mineral oil. Faith and hope would not abide in the patient even though the prescription were purest charity.

A. E. H.

PROGRAM OF THE MINNESOTA DIVISION, AMERICAN CANCER SOCIETY

Growing interest in cancer control has resulted in increased activity by the American Cancer Society and the United States Public Health Service. In 1947, the Minnesota Division, American Cancer Society, collected slightly in excess of $230,000.00; 40 per cent of this sum was sent to the American Cancer Society for national use and 60 per cent was retained locally.

The objectives of all cancer control programs are education, research, and service. Minnesota's education service includes exhibits, educational booklets and pamphlets, and courses of study for high school students. In addition, the cancer society and the health department jointly sponsor courses for physicians at the Center for Continuation Study and give a copy of each bulletin of the Illinois Medical and Cancer Society to every practicing physician in the state. In addition, the cancer society sponsors courses of instruction for its laymen and the public health nurses from all sections of the state. Early in 1947, special one-day trial courses for physicians and others were offered at Worthington, Minnesota, and because of their success, similar one-day courses will be repeated in other parts of the state. The main purpose of all these programs is to emphasize the importance of early diagnosis and prompt treatment for malignant disease.

Cancer research money is difficult to spend properly even though millions are available. Cancer research buildings must be constructed and staffs assembled before the problems can be attacked. Many universities are not willing to undertake cancer projects at this time and there is a dearth of trained researchers. Cancer research will proceed along two lines—fundamental and practical. In the fundamental field it will be necessary to start at the beginning to learn the secrets of life itself; in a practical way, much can be done to improve present methods of diagnosis and treatment. It is unfortunate that the public has been led to believe that the cancer problem can be solved by appropriation of money as was the case in atomic research for most of the fundamental aspects of the atom question had been solved before war was declared and this is not true of cancer.

The Minnesota Division has promised to give $300,000.00 to the University of Minnesota for the erection of two floors in the Mayo Memorial building to be devoted exclusively to cancer research. The University already has a large group of competent cancer researchers at work but they occupy crowded quarters which slows down their investigations. To date, $150,000.00 has been given and the Cancer Society hopes to raise the balance in the next two years. There is no quarrel in our state between the United States Public Health Service representative, the state Department of Health and the state representative of the American Cancer Society as far as research programs are concerned. National Cancer Society leaders questioned the appropriation of too much money by Congress because of the present status of cancer research and did not oppose the idea of government cancer activity as was erroneously reported.

Cancer service programs consist of (1) information services, (2) detection centers, (3) cancer diagnostic clinics, (4) cancer diagnostic and treatment clinics. An information service acts as headquarters for lay education and laymen applying for technical advice are referred to physicians or the local medical society. A detection center is a place to which apparently normal individuals are referred (or come of their own accord in some states) for examination to determine if they have cancer. Centers which do not undertake special diagnostic services or treatment refer patients to physicians for treatment. University of Minnesota is planning such a detection center and funds have been appropriated for this purpose by the cancer society and health department. The plan has received the approval of the Minnesota State Medical Association and the Hennepin County Medical Society but details of operation have not been worked out. No cancer clinics are planned for our state.

Much remains to be done in the field of cancer control. Cooperation of the medical profession in furthering the cause of cancer control is essential to the success of the program and the American Medical Association and various state societies are working in close cooperation with the cancer societies and health departments to this end. We in Minnesota plan to proceed cautiously in order that our funds may be used to best advantage.

William A. O'Brien, M.D.

Transactions of the Montana State Medical Society

Sixty-ninth Annual Session
Missoula, Montana, June 25-28, 1947

OFFICERS, 1947-1948

(Elective)

LOUIS W. ALLARD, Billings	President
THOS. L. HAWKINS, Helena	President-Elect
FRANCIS W. AUBIN, Havre	Vice-President
HERBERT T. CARAWAY, Billings	Secretary-Treasurer
R. F. PETERSON, Butte	Delegate to A.M.A.
T. L. HAWKINS, Helena	Alternate Delegate to A.M.A.

EXECUTIVE COMMITTEE

L. W. ALLARD, Chairman	Billings
T. L. HAWKINS	Helena
H. T. CARAWAY	Billings
B. R. TARBOX	Forsyth
M. A. SHILLINGTON	Glendive

COUNCILORS

Councilors to fill expired terms were not elected as the new constitution provides that they be chosen by district societies.

APPOINTED COMMITTEES

(Committee appointments are all for one year unless otherwise designated)

ECONOMICS COMMITTEE

J. H. GARBERSON, Chairman	Miles City
J. C. SHIELDS	Butte
R. B. DURNIN	Great Falls
I. J. BRIDENSTINE	Missoula
J. I. WERNHAM	Billings

LEGISLATIVE COMMITTEE

J. M. FLINN, Chairman	Helena
W. F. CASHMORE	Helena
R. W. MORRIS	Helena
E. H. LINDSTROM	Helena
A. R. LITTLE	Helena

NECROLOGY AND HISTORY OF MEDICINE COMMITTEE

E. D. HITCHCOCK, Chairman	Great Falls
J. H. IRWIN	Great Falls
C. S. SMITH	Bozeman
S. A. COONEY	Helena
F. F. ATTIX	Lewistown

PUBLIC RELATIONS COMMITTEE

J. C. SHIELDS, Chairman	Butte
E. S. MURPHY	Missoula
J. C. MacGREGOR	Great Falls
R. D. KNAPP	Wolf Point
R. L. TOWNE	Kalispell
J. H. BRIDENBAUGH	Billings
J. M. FLINN	Helena

LEGAL AFFAIRS AND MALPRACTICE COMMITTEE

J. C. Mac GREGOR, Chairman	Great Falls
J. H. BRIDENBAUGH	Billings
H. H. JAMES	Butte
T. B. MOORE, JR.	Kalispell
G. W. SETZER	Malta
C. H. FREDRICKSON	Missoula

PROGRAM COMMITTEE

T. F. WALKER, Chairman	Great Falls
H. W. GREGG	Butte
C. H. FREDRICKSON	Missoula
H. T. CARAWAY	Billings
R. E. SMALLEY	Billings

INTERPROFESSIONAL RELATIONSHIP COMMITTEE

M. A. SHILLINGTON, Chairman	Glendive
B. R. TARBOX	Forsyth
F. D. HURD	Great Falls
P. T. SPURCK	Butte
L. W. BREWER	Missoula

NOMINATING COMMITTEE

T. L. HAWKINS, Chairman	Helena
F. F. ATTIX	Lewistown
J. E. HYNES	Billings
R. F. PETERSON	Butte
J. H. IRWIN	Great Falls

AUDITING COMMITTEE

G. W. SETZER, Chairman	Malta
R. G. JOHNSON	Harlowton
P. L. ENEBOE	Bozeman
W. E. HARRIS	Livingston
S. V. WILKING	Butte

CANCER COMMITTEE

E. HILDEBRAND, Chairman	Great Falls
R. F. PETERSON	Butte
C. H. FREDRICKSON	Missoula
W. C. ROBINSON	Shelby
W. F. CASHMORE	Helena
E. L. HALL	Great Falls
H. V. GIBSON	Great Falls
B. K. KILBOURNE	Helena
MARY E. MARTIN	Billings

MATERNAL AND CHILD WELFARE COMMITTEE

F. L. McPHAIL, Chairman	Great Falls
L. W. BREWER	Missoula
P. L. ENEBOE	Bozeman
D. L. GILLESPIE	Butte
A. L. GLEASON	Great Falls
E. L. HALL	Great Falls
T. L. HAWKINS	Helena
MAUDE GERDES	Billings
B. C. FARRAND	Jordan
G. W. PEMBERTON	Butte
S. N. PRESTON	Missoula
R. L. TOWNE	Kalispell
G. A. CARMICHAEL	Missoula
E. A. HAGMANN	Billings
O. C. RATHMAN	Billings

TUBERCULOSIS COMMITTEE

F. I. TERRILL, Chaiman	Galen
A. R. FOSS	Missoula
P. L. ENEBOE	Bozeman
E. M. LARSON	Great Falls
C. W. LAWSON	Havre

FRACTURE AND ORTHOPEDIC COMMITTEE

J. K. COLMAN, Chairman	Butte
J. C. WOLGAMOT	Great Falls
L. C. ALLARD	Billings
S. L. ODGERS	Butte
W. H. HAGEN	Billings

RURAL HEALTH COMMITTEE

E. M. GANS, Chairman	Harlowton
R. M. STEWART	Whitefish
L. W. BREWER	Missoula
M. D. WINTER	Miles City
C. W. LAWSON	Havre

INDUSTRIAL WELFARE COMMITTEE

S. A. COONEY, Chairman	Helena
P. E. LOGAN	Great Falls
H. H. JAMES	Butte
W. E. LONG	Anaconda
E. M. ADAMS	Red Lodge

RHEUMATIC FEVER AND HEART COMMITTEE

F. R. SCHEMM, Chairman	Great Falls
H. W. GREGG	Butte
A. R. KINTNER	Missoula
H. E. McINTYRE	Billings
O. M. MOORE	Helena
E. A. HAGMANN	Billings
A. L. GLEASON	Great Falls

PROCEEDINGS OF THE SPECIAL MEETING OF THE HOUSE OF DELEGATES

June 25, 1947

Hotel Florence, Missoula, Montana

The special meeting of the House of Delegates was held in the Florentine Gardens of the Hotel Florence, Wednesday evening, June 25, at 8:30 P.M. Dr. M. A. Shillington, state president of the Montana State Medical Association, presided.

A motion was made by Dr. R. G. Johnson, seconded by Dr. H. W. Gregg, that qualification of the delegates be dispensed with. Motion carried.

Dr. Shillington then explained the purpose of the special meeting. Dr. J. C. Shields, chairman of the Public Relations committee of the Montana State Medical Association, was to testify on Thursday morning, June 26, 1947, before the Senate Committee on Health and Public Welfare on Senate Bill 545. Since he lacked authority as an officer of the association, it was felt that a resolution of the House of Delegates should be sent him to give him the backing of the association.

After discussion of this bill (S. 545) and Senator Murray's ard made a motion that a resolution be passed in favor of S. 545 and that Dr. J. C. Shields be authorized to speak for the Montana State Medical Association. The motion was seconded by Dr. H. W. Gregg and carried with one dissenting new bill, S. 1320, and bills S. 140 and S. 712, Dr. L. L. Howvote.

Dr. J. C. MacGregor then made a motion, seconded by Dr. J. H. Irwin, that the Montana State Medical Association go on record as being opposed to S. 140. Motion is to include our notification of our senators and representatives to that effect and a request that they aid us in defeating this bill. Motion carried.

Mr. Harvey Sethman, executive secretary of the Colorado State Medical Society, was then introduced and spoke briefly about the *Rocky Mountain Medical Journal,* and about Montana being the next sponsors of the Rocky Mountain Medical Conference in 1949. He extended the official greetings from the Colorado State Medical Society to the Montana State Medical Association and put himself at the service of the association in any way possible.

Motion was made by Dr. T. F. Walker, seconded by Dr. H. W. Gregg, that the Special Meeting of the House of Delegates of the Montana State Medical Association be adjourned. Motion unanimously carried.

PROCEEDINGS OF THE COUNCIL OF THE MONTANA STATE MEDICAL ASSOCIATION

Sixty-ninth Annual Meeting

June 25, 1947

Hotel Florence, Missoula, Montana

The Council of the Montana State Medical Association convened on Wednesday evening, June 25, 1947, immediately after adjournment of the special meeting of the House of Delegates. Dr. M. A. Shillington acted as chairman until Dr. J. H. Irwin was elected chairman by a unanimous vote.

Roll call by the secretary disclosed a quorum was present.

The matter of an official journal for the Montana State Medical Association was discussed. Dr. M. A. Shillington discussed the fine relationship which has existed for many years between the Journal-Lancet and the Montana State Medical Association, but expressed the view that possibly we could be better served in the future by the same journal serving the other states in the Rocky Mountain Medical Conference, namely, the *Rocky Mountain Medical Journal.* This was merely brought up for the Council to discuss and act upon.

A motion was made by Dr. T. R. Vye, seconded by Dr. H. W. Gregg, that the *Rocky Mountain Medical Journal* be adopted as the official journal of the Montana State Medical Association.

After discussion, in which it was brought out that Mr. L. M. Cohen, publisher of the Journal-Lancet, was scheduled to appear before the Council on Friday morning, June 27, Dr. T. R. Vye withdrew his original motion. Motion was then made by Dr. H. W. Gregg, seconded by Dr. G. W. Setzer, that the matter be tabled until Friday morning after the Council had heard Mr. Cohen. Motion was unanimously carried.

The chairman, Dr. J. H. Irwin, then appointed Dr. G. W. Setzer and Dr. R. G. Johnson as an Audit committee to audit the books of the association.

Dr. H. W. Gregg made a motion, seconded by Dr. J. H. Garberson, that a recommendation be made to the House of Delegates that Mr. E. G. Toomey be retained at the present retainer fee as attorney for the association. Carried by unanimous vote.

Motion was made by Dr. H. W. Gregg, seconded by Dr. G. W. Setzer, that the Council adjourn until Friday morning, June 27, at 7:30 A.M. Carried by unanimous vote.

The Council met again at 7:30 A.M. Friday morning, June 27. In the absence of Dr. J. H. Irwin, who had been elected chairman for this annual session, Dr. M. A. Shillington again acted as temporary chairman until another could be appointed.

The members of the Council who were present and who voted were as follows: Dr. J. H. Garberson, Dr. T. R. Vye, Dr. D. T. Berg, Dr. G. W. Setzer, Dr. C. W. Lawson, Dr. R. G. Johnson, Dr. T. B. Moore, Jr., and Dr. H. W. Gregg.

Motion was made by Dr. J. H. Garberson, seconded by Dr. D. T. Berg, that Dr. M. A. Shillington act as chairman for this meeting. Motion unanimously carried.

The business of an official journal for the Montana State Medical Association was then discussed.

Mr. L. M. Cohen, publisher of the Journal-Lancet, was heard by the Council. He asked for a year's trial before any decision was made, before a renewal of the contract between the Montana State Medical Association and the Journal-Lancet, or before another magazine was adopted as the official journal. He spoke of the friendly relations that had always existed between the Montana State Medical Association and the Journal-Lancet through the years that the Journal-Lancet had been the official journal of the association.

Mr. Harvey Sethman, editor of the *Rocky Mountain Medical Journal,* was then called in and answered questions about the *Rocky Mountain Medical Journal.* In 1937 the Montana State Medical Association was invited to join with the *Rocky Mountain Medical Journal,* which is the official journal of the other four states comprising the Rocky Mountain Medical Conference: Utah, Wyoming, Colorado and New Mexico. Since that time they have not solicited the business of the association.

Following considerable discussion on the point in question, a motion was made by Dr. J. H. Garberson, seconded by Dr. D. T. Berg, that the Journal-Lancet be notified that at the end of the present contract, December 31, 1947, the relationship be terminated, and that the secretary be instructed to enter into an agreement with the *Rocky Mountain Medical Journal* to accept that journal as the official journal of the Montana State Medical Association. Unanimously carried.

Since there was no other business before the Council, a motion was made by Dr. T. R. Vye, seconded by Dr. D. T. Berg, that the Council adjourn for this annual session. Motion carried.

PROCEEDINGS of the HOUSE OF DELEGATES SIXTY-NINTH ANNUAL MEETING of the MONTANA STATE MEDICAL ASSOCIATION

June 26, 27, 28, 1947

Hotel Florence, Missoula, Montana

The meeting of the House of Delegates of the Montana State Medical Association was called to order at 8:00 A.M., Thursday morning, June 26, in the Governor's Room of the Hotel Florence, by Dr. M. A. Shillington, president, Montana State Medical Association.

The delegates representing the component societies were then qualified upon presenting their credentials and roll call of the Secretary. A quorum was present.

Dr. J. H. Irwin, chairman of the Nominating committee, read the nominations for elections to offices for the coming year.

Dr. T. R. Vye was appointed chairman of the Resolutions committee.

Motion was made, seconded and carried that the House dispense with the reading of the minutes of the last session, inasmuch as they appeared in the Journal-Lancet and were distributed in this manner to each member.

Mrs. Ellenore M. Bridenstine, who for the past two years was a member of the state legislature, was presented by Dr. M. A. Shillington, and gave a few pertinent remarks about legislation that was passed at the last session of the legislature and she made suggestions as to what the medical profession might do in the future to aid their cause.

Dr. S. A. Cooney made a motion that we extend a vote of thanks and our gratitude to Mrs. Bridenstine who was the only one who represented the medical profession in the last session of the state legislature. Motion was seconded and carried. Dr. R. W. Morris made an amendment to the motion that we add a big bouquet of roses to our vote of thanks. Amendment carried.

Dr. M. A. Shillington then read the following letter from Dr. C. H. Swanson, chairman, Legislative committee, Montana State Dental Association, addressed to Dr. Shillington as president of the Montana State Medical Association:

"At our meeting in Missoula the Montana Dental Association voted to cooperate with the Montana State Medical Association in drafting a new State Board of Health Law.

"The Executive committee of the State Dental Association for the coming year are: Dr. E. A. Beaudin of Kalispell, chairman; G. C. Taylor, Billings, and R. Betzner, Helena. The Legislative committee consists of myself as chairman, H. Fearn of Bozeman, and F. E. Laing of Billings. Dr. G. C. Taylor, Billings, is president-elect and a member of the Executive committee.

"The State Dental Association appointed the Legislative committee all from this section of the state so that they could work together on this legislation. If your association would see fit to appoint your Legislative committee from this same area it would make it much easier for us to get together with your committee.

"I feel that it will require the united efforts of the doctors, druggists and dentists if we are going to avert the present trend towards socialized medicine."

Discussion which followed indicated the feeling of the House of Delegates that an attempt be made during the ensuing year for much closer cooperation between our association and the Montana State Dental Association. It was suggested that this be initiated by an early meeting of the Executive Committee of the Dental Association together with our Executive Committee and Interprofessional Relationships Committee.

Secretary's Report to the House of Delegates

This Sixty-ninth Annual Session of the Montana State Medical Association finds us in an extremely busy period, what with the many readjustments following the return of both civilians and medical men from the armed forces and the redistribution of physicians in relation to urban and rural populations.

Your secretary's office has been an extremely busy place the past 12 months. Had it not been for the most able assistance of our full-time stenographer, Mrs. Gesine A. Groshart, it would have been impossible to carry on and do the many chores demanded of your secretary. Because of the lack of available office space, she has been quartered in the secretary's office as a temporary arrangement. Mrs. Groshart probably knows more about our association and its internal workings from the standpoint of the secretary's office than anyone in the state and we sincerely hope that her services will continue to be available to our association. It is impossible for any doctor to begin to do the work himself or with part-time assistance in this office.

Our association is in a better position financially than at any time within the recollection of the secretary. Also our membership is greater than at any former period. There are registered in Montana 557 physicians. 429 of these are members of the association; only 13 of our members have not paid their 1947 dues. Of the 557 physicians registered in the state through April of this year, 33 are indicated as being still in the armed forces. 58 doctors registered, with Montana addresses, are not members of the association. It is interesting to note, however, that in 1940 there were 408 members of the association and at the present time 429.

Legislative matters have continued to take time and attention, with several bills before Congress that vitally concern organized medicine. On Senate Bill 545—the Taft Bill—which is at the present time being heard before the Senate Committee on Labor and Public Welfare, Montana was chosen by the committee as one of only six state medical associations asked to testify. Dr. J. C. Shields, chairman of our Public Relations committee, will testify this morning. As you all know, our Senator Murray has again introduced in the Senate Bill No. 1320, which is his revised edition of the old Murray-Wagner-Dingell bill. This piece of proposed legislation bears careful watching. You are all acquainted with legislation which concerned us in the last legislature in Helena. Your state association was in the middle of several brisk encounters and your secretary is very apprehensive as to what may ensue at the next legislature unless closer cooperation can be obtained, particularly between us and the State Dental Association. Your secretary strongly recommends that our Executive and Legislative committees work during the coming two years prior to the next legislature in the closest cooperation with similar committees representing the State Dental Association.

Several radio programs have been sponsored by the American Medical Association during the past year. Many of these in commemoration of the 100th Anniversary of the American Medical Association. Much credit is due our own Dr. E. S. Murphy of Missoula for the preparation of the material accepted for the Montana-Colorado-Utah-Wyoming program of "Doctors—Then and Now" in which the life of Father Ravilli was dramatized over a national hookup.

Your secretary attended the meeting in Chicago last December of the state secretaries which preceded the meeting of the House of Delegates of the American Medical Association. This meeting was an extremely interesting one and also was invaluable from the standpoint of giving your secretary many helpful suggestions relative to the more efficient administration of his office. He also attended the Rocky Mountain Medical Conference in Albuquerque in May. Because of the distance from Montana, of course our state was poorly represented. However, three of us did get to this meeting and, in the opinion of your secretary, it was one of the best meetings devoted purely to scientific discussions that he has ever had the privilege of attending. I sincerely hope that this House of Delegates will see fit to sponsor the 1949 meeting of the Rocky Mountain Medical Conference and would suggest that it be held in Yellowstone Park. Action must be taken on this matter at this meeting of the House of Delegates in order that preparations for the meeting can begin immediately; especially regarding reservations in the Park.

One of our component medical societies entered the A.A.P.S. essay contest. These essays were on the subject: "Why the Private Practice of Medicine Furnishes This Country With the Finest Medical Care." In conjunction with hundreds of entrants throughout the United States the winner of this nationwide contest and recipient of the first prize of $1,000 was a young lady from Benchland, Montana, Miss Jean Downhour, of Judith Basin county, which is under the jurisdiction of the Fergus County Medical Society. Much credit should go to our Dr. Fred F. Attix for his enthusiasm in disseminating information to schools in his territory regarding this essay contest. Dr. Attix is delegate from Montana to the House of Delegates of the A.A.P.S.

Several states have given their official endorsement to this organization which is actively engaged, not only in combating legislation harmful to the profession, but in a nation-wide public relations campaign which is highly commendable and your secretary hopes that at this meeting of the House of Delegates, Montana will add its official endorsement to this great organization.

A monthly Bulletin has been instituted and mailed out from the secretary's office; the first copy leaving in October 1946. While this endeavor entails considerable extra work in the secretary's office, we are of the opinion that its public relations value is worth the effort. Its value in keeping the individual physician in closer touch with his association's activities, we believe, justifies its continuance. However, we would appreciate an expression from the House of Delegates relative to this particular venture.

Also in passing, we wish to mention that the $1,000 loan which was made to the Hospital Service Association in assisting in its organization, has been repaid. The Montana Physicians' Service is in a much better position than it was a year ago as you will be informed later, and the cooperation which we have received from the Hospital Service Association is increasing and improving daily.

In closing, your secretary wishes to report that in his opinion this has been a most successful year for our association. We are entirely solvent and we are certainly standing on our own two feet and ready and willing to engage in any enterprise which promises to better the position of the medical profession here in our own state or nationally. We also take this opportunity to thank the individual members of the association for their cooperation during the past year and it has been a real pleasure to serve as your secretary.

Herbert T. Caraway, M.D., Secretary

The secretary's report was formally accepted by the House of Delegates.

Dr. G. W. Setzer, chairman of the Auditing committee, reported that the books of the association had been audited and commended the secretary for the complete and accurate records he has kept of the association's finances. Dr. J. I. Wernham moved that the report of the Auditing Committee be accepted. The motion was seconded by Dr. Wilking and unanimously carried.

Mr. Harvey Sethman, executive secretary of the Colorado State Medical Society, spoke to the House of Delegates in detail about the next meeting of the Rocky Mountain Medical Conference to be held in 1949. This is a bi-annual meeting devoted entirely to scientific discussions and is devoid of medical politics. The meetings rotate between the participating states, although any state can postpone its position as host. The meetings are designed to be self-supporting, though there is a surplus fund to take care of advance publicity, etc. The Executive committee of five members, one from each state in the conference, meets twice during the two-year period. There should not be any cost to sponsoring the 1949 meeting, although it would be wise to underwrite a small sum to cover post-convention expenses. The chairman of the Program committee should be a member of the sponsoring state, with a committeeman from each of the other states. There should be another committee, composed wholly of members of the sponsoring state, preferably living near the location of the meeting, to assume charge of the entertainment. If Montana decides to be the host to the next convention, one of the Montana members of the Continuing committee will be chosen by the committee to act as general chairman for the next conference. The Continuing committee will meet again in Denver on September 8th, at the time the Colorado State Medical Society has its annual session, and will receive whatever decision has been made.

Dr. T. F. Walker moved that the Montana State Medical Association be host to the Rocky Mountain Medical Conference to be held in 1949 in Yellowstone National Park. The motion was seconded by Dr. L. L. Howard and unanimously carried.

Dr. H. W. Gregg suggested that Montana sponsor this meeting alone and Dr. R. W. Morris included in the above motion an amendment that $500.00 be appropriated to cover the advance cost of this conference. Motion with the amendment was passed. The secretary was authorized to acknowledge the telegram from the Wyoming Medical Society offering their services either as co-host or assisting in the conference.

Dr. F. F. Attix, chairman of the Hospital committee, reported "No comments or report."

Dr. J. P. Ritchey gave an oral report for the advisory committee to the Woman's Auxiliary to the Montana State Medical Association. New chapters have been organized at Lewistown and Havre, bringing the total membership up to 230. The work of the auxiliary has been very enthusiastically carried out. Since there are only two delegates from the Montana Woman's Auxiliary to the National Auxiliary, and since there are over 400 members of the Montana State Medical Association, it was suggested by Dr. Ritchey that the Montana State Medical Association pay the national dues for the wives and for the widows of former member-doctors. It was explained that this would enable the Montana Auxiliary to have a larger representation in the National Auxiliary.

Motion was made, seconded and carried that the Montana State Medical Association pay the national dues to the Woman's Auxiliary of the American Medical Association for every wife or widow of a doctor who is (or was) a member of the Montana State Medical Association.

Since it was time for the scientific sessions to begin, motion was made, seconded and carried that the meeting of the House of Delegates be adjouned until Friday morning, June 27th, at 8:00 A.M.

* * * * *

The House of Delegates met at 8:00 A.M. in the Governor's Room of the Hotel Florence on Friday morning, June 27th, President M. A. Shillington presiding. Roll call was taken by the secretary and a quorum was present.

Dr. M. G. Danskin reported on the revision of the Constitution and By-Laws, presented the report of the committee and moved that the report be adopted. The motion was seconded by Dr. R. F. Peterson. After discussion of the proposed Constitution and By-Laws, the motion was withdrawn by Dr. Danskin.

Dr. L. W. Allard moved that a committee be appointed to go over the old and the revised Constitutions and By-Laws and that this committee meet at some definite time and place so that any member of the House of Delegates or any member of the association might visit the committee and go over the points in question. This committee was ordered to report back to the House of Delegates on Saturday morning. The motion was seconded by Dr. J. K. Coleman and unanimously carried.

The committee was to meet at 1:00 P.M., June 27th, in Room 722 of the Hotel Florence, and was to report immediately after the conclusion of the business of the Montana Physicians' Service on Saturday morning, June 28th. The following doctors were appointed as members of the committee: Dr. R. F. Pererson, chairman, Dr. J. H. Garberson, Dr. T. F. Walker, Dr. T. R. Vye, Dr. H. W. Gregg.

The report of the Committee on Maternal and Child Health was given by Dr. F. L. McPhail, chairman.

Dr. M. A. Shillington commended the committee for their very thorough work and report. Dr. J. C. Shields moved that the report be accepted. The motion was seconded by Dr. F. F. Attix and carried. Recommendation was made that the committee be kept intact since they worked together so well.

During discussion it was brought out that a meeting was held in Great Falls the first two days of the week (June 23-24) of the Public Health League of Montana. Dr. M. A. Shillington attended and reported an excellent program. The meeting was attended by over 100 people, comprising educators, school superintendents, nursing groups, agricultural groups, industrial groups. The medical profession was represented by five doctors. Dr. Shillington recommended that the medical association take more interest and that each society send at least one doctor to these meetings of the Montana Public Health League, as one of the besr public relations measures that could be taken.

The proposed change in the personnel of the State Board of Health was discussed. This proposal was tabled in the stare legislature, due largely to the good work of some of the doctors in Helena. It was recommended that work be started immediately on establishing better relations with the Montana State Dental Association; that there be more cooperation with a similar group from their association.

A survey has been made of the hospital service in the state of Montana and printed in booklet form. Dr. M. A. Shillington had copies of this booklet distributed to all the physicians present.

Dr. R. C. Monahan spoke for the State Board of Health.

The report of the Cancer committee was given by Dr. E. Hildebrand, chairman of the committee. Dr. J. H. Garberson and Dr. T. F. Walker spoke on the point of giving free biopsies. Rather than give free biopsies, it was deemed advisable to educate the laymen so they would be willing to pay for the biopsy, hospital bill, if any, and the pathologists' fees. Motion was made by Dr. T. F. Walker that the report of the Cancer committee be accepted, with the exception of giving free biopsy service. The motion was seconded by Dr. R. C. Monahan and carried.

Dr. J. K. Coleman gave the report for the Orthopedic committee. It was moved by Dr. J. I. Wernham, and seconded by Dr. M. G. Danskin, that the report of the Orthopedic committee be accepted. Motion carried.

Dr. F. R. Schemm spoke on the subject of rheumatic fever and heart conditions. After discussion of the subject, a morion was made by Dr. T. R. Vye, seconded by Dr. J. H. Garberson, that a new committee be set up; this committee to be called the Rheumatic Fever and Heart committee. The motion was carried with one dissenting vote.

The report of the Economics Committee was given by Dr. J. H. Garberson. Motion was made, seconded and carried that this report be accepted.

The report of the Public Relations committee was read by the secretary in the absence of Dr. E. S. Murphy, chairman of this committee. The report was formally accepted.

Dr. F. I. Terrill, as chairman, gave the report of the Tuberculosis committee, with recommendations. Dr. C. W. Lawson made a motion that the report of this committee, with recommendations, be accepted. The motion was seconded by Dr. R. C. Monahan and carried.

The report of the Necrology committee was given by Dr. E. D. Hitchcock. After formal acceptance of this report, all present stood in silent tribute to the members of the Montana State Association who have passed on during the year since the last annual meeting.

Dr. B. K. Kilbourne gave the report of the Professional Relations committee. This report was accepted on motion by Dr. A. Karsted, with second by Dr. F. F. Attix, and unanimously carried.

Dr. M. A. Shillington reported for the Legislative committee, who asked that the report on legislation before the state legislature, which was prepared and distributed by Mr. E. J. Toomey, be accepted as the report of that committee. Motion that this be done was made, seconded and carried.

The report of the Historical committee was given by Dr. B. K. Kilbourne and accepted on motion by Dr. F. F. Attix, with second by Dr. A. Karsted, and unanimously carried.

Dr. R. E. Peterson, delegate to the American Medical Association from Montana, gave a brief report on the meetings of the House of Delegates. Detailed reports have been published in the *Journal* of the American Medical Association in December 1946 and June 1947.

A letter from Mrs. Ellenore M. Bridenstine, acknowledging the flowers with thanks, was read by the secretary.

Motion was made by Dr. F. F. Attix, seconded by Dr. R. F. Peterson, and carried, that the meeting of the House of Delegates adjourn until Saturday morning, June 28th.

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The meeting of the House of Delegates as owners and operators of the Montana Physicians' Service, was called to order by Dr. M. A. Shillington, at 8:00 A.M. on Saturday, June 28th, in the Governor's Room of the Hotel Florence.

Mr. Samuel English, executive director, gave a detailed report on the Montana Physicians' Service now as compared with a year ago; that it is now in a sound financial condition and they hope to maintain it on that basis. It is one of the few prepayment medical plans that has had complete cooperation of the Veterans Administration; and that is paying the doctors 100 per cent. Dr. T. L. Hawkins stated reasons why the Montana Physicians' Service was started and that they were fortunate in securing the services of Mr. English, who was well trained in such work in California. He also gave credit to Dr. J. C. Shields, Dr. F. F. Attix and Dr. J. P. Ritchey for their part in the organization and continuance of Montana Physicians' Service. He spoke of the early days of getting together with the Blue Cross and of the plans for the future.

The following doctors were nominated from the floor for the vacancies on the Board of Trustees: Dr. T. L. Hawkins, Dr. W. E. Harris, Dr. L. W. Brewer. Motion to close the nominations was made by Dr. F. F. Attix, seconded by Dr. R. V. Morledge, and carried.

Nominations were re-opened at the request of Dr. F. L. McPhail after discussion by Dr. R. W. Morris, who then nominated Dr. C. M. Mears, Dr. F. W. Aubin and Dr. B. R. Tarbox. Motion to again close nominations was made by Dr. F. F. Attix, seconded by Dr. A. Karsted, and carried.

Dr. T. L. Hawkins, Dr. W. E. Harris and Dr. L. W. Brewer were elected by ballot to fill the vacancies on the Board of Trustees of the Montana Physicians' Service.

Dr. A. Karsted made a motion, seconded by Dr. F. F. Attix, that the meeting of the owners and operators of the Montana Physicians' Service be adjourned. Motion unanimously carried.

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Immediately after adjournment of the meeting of the owners and operators of the Montana Physicians' Service, the House of Delegates was again called to order by Dr. M. A. Shillington.

A motion was made by Dr. F. F. Attix that the House of Delegates favorably consider being affiliated with the Association of American Physicians and Surgeons. Motion was seconded by Dr. T. F. Walker and carried.

Dr. B. R. Tarbox made a motion that the House of Delegates go on record as favoring the inclusion of dentists on the State Board of Health. After discussion by Dr. F. L. McPhail, Dr. T. L. Hawkins and others, a motion was made, seconded and carried, with one dissenting vote, that this matter be tabled until next year. Dr. F. L. McPhail moved that the incoming president take the matter under consideration and report at the next annual meeting. Motion was seconded by Dr. J. K. Coleman and carried.

Dr. R. F. Peterson gave the report of the reference committee for the proposed Constitution and By-Laws. He then made a motion that the report of the reference committee on the Constitution and By-Laws be accepted. Motion was seconded by Dr. A. Karsted and carried. Dr. Peterson then moved that the new Constitution and By-Laws, as amended, be adopted. The motion was seconded by Dr. F. F. Attix and carried. Motion was then made by Dr. Peterson that the secretary be instructed to correct any errors of punctuation, grammar, or spelling that do not change the meaning of any sentence, and he be further instructed to have the Constitution and By-Laws indexed and printed. The motion was seconded by Dr. T. F. Walker and carried.

The duties and purposes of the Interprofessional Relationship committee were explained by Dr. M. A. Shillington.

The list of nominees was read to the House of Delegates. Dr. M. A. Shillington then asked for nominations from the floor, if any.

Dr. T. R. Vye nominated Dr. T. L. Hawkins for president-elect. This was seconded by Dr. S. A. Cooney.

Dr. B. R. Tarbox nominated Dr. T. F. Walker for president-elect; this was seconded by Dr. A. Karsted. Dr. Walker asked that his name be withdrawn due to the fact that he had been forced to be absent from his work and from the state considerably during the past year because of ill health.

Also nominated from the floor for inclusion in the list to be sent to the Governor for appointment to the State Board of Health were: Dr. B. C. Farrand, Dr. I. J. Bridenstine, Dr. R. E. Brogan, and Dr. W. H. Hagen. Motion was made that the outgoing members of the State Board of Health be added to the list.

Dr. B. R. Tarbox and Dr. M. A. Shillington were nominated from the floor for the vacancies on the Executive committee.

Motion was made, seconded and carried that the nominations be closed.

While the ballots were being tallied, Dr. F. L. McPhail made the statement that a request had come from the various organized groups that the governor appoint a citizen's committee which will be called the Montana Health Committee. Problems in connection with community health, and setting up health departments, etc., will be considered. He suggested that the Montana State Medical Association should cooperate and enter into this on a friendly basis. The governor will approach the president of the state association, asking for a representative from this association.

Dr. J. C. Shields gave a verbal report on legislative matters and his trip to Washington earlier in the week.

The results of the vote by ballot were as follows:

President-Elect: Thos. L. Hawkins, Helena.
Vice-President: Francis W. Aubin, Havre.
Secretary-Treasurer: Herbert T. Caraway, Billings.
For Vacancies on Executive Committee:
  B. R. Tarbox, Forysth
  M. A. Shillington, Glendive.
For recommendations to governor for appointment to State Board of Health:
    E. A. Welden, Lewistown
    D. T. Berg, Helena
    Harold Schwartz, Butte
    J. C. MacGregor, Great Falls
    J. M. Nelson, Missoula
    B. C. Farrand, Jordan
    I. J. Bridenstine, Missoula
    R. E. Brogan, Billings
    W. H. Hagen, Billings.

Dr. Herbert T. Caraway read an invitation from the Yellowstone Valley Medical Society that the Montana State Medical Association hold the 1948 annual session in Billings. Motion was made by Dr. A. Karsted, seconded by Dr. J. C. Shields, that the invitation to hold the next annual meeting of the House of Delegates and the Scientific Session in Billings, be accepted. Motion carried.

Dr. F. W. Aubin spoke relative to the fee schedule of the Industrial Accident Board and moved that the House of Delegates take some action to make adjustments. The motion was amended that the Economics committee be instructed to deal with the matter of the Industrial Accident Board fee schedule, seconded and carried.

A motion was made, seconded and carried that the Montana State Medical Association extend to Dr. M. A. Shillington, the outgoing president, their thanks and appreciation for the work he has done during the past year.

Motion that the House of Delegates adjourn for this annual session was made, seconded and carried.

REPORTS OF STANDING COMMITTEES

Nominating Committee

This committee, after due consideration, submits the following nominations for offices of the Montana State Medical Association for the year 1947-48:

For President-Elect: Dr. Clyde H. Fredrickson, Missoula; Dr. T. B. Moore, Jr., Kalispell.

For Vice-President: Dr. F. W. Aubin, Havre; Dr. Geo. W. Setzer, Malta.

For Secretary-Treasurer: Dr. H. T. Caraway, Billings; Dr. Paul J. Gans, Lewistown.

For Recommendations to Governor for appointment to State Board of Health: Drs. E. A. Welden, Lewistown; D. T. Berg, Helena; Harold Schwartz, Butte; J. C. MacGregor, Great Falls; J. M. Nelson, Missoula.

J. H. Irwin, M.D., Chairman
Fred F. Attix, M.D.
C. H. Fredrickson, M.D.

Cancer Committee

The Cancer committee is made up of eight physicians: W. F. Cashmore, C. H. Fredrickson, H. V. Gibson, E. L. Hall, E. Hildebrand, B. K. Kilbourne, R. F. Peterson, and W. C. Robinson.

As in the past, the committee has cooperated closely with the Montana Division of the American Cancer Society, and forms the majority of the executive committee of this society. The society has recently incorporated. The constitution and by-laws emphasize the maintenance of strong state control of the society by physicians. This has been carried out. A physician is president of the board of directors and another physician is chairman of the executive committee. Mrs. H. W. Peterson has been named executive vice-president of the board of directors, and, with this new title, continues her excellent work of lay education and service.

During the year, four meetings of the committee were held and four major projects were undertaken. (1) The reporting of cancer cases by physicians. (2) Cooperation in the lay education program. (3) A physician education program. (4) An indigent patient service program. These will be taken up in order.

*Reporting of Cancer Cases by Physicians**

A cancer report form was designed. This form is brief but includes data necessary to the proper conduct of statistical cancer research. Each physician in the state received a pad of ten of these blanks together with a letter explaining the reporting of cancer cases and asking for his cooperation. The State Board of Health in Helena has the administrative set-up to take care of the register, and so it has been established there under the direction of Dr. B. K. Kilbourne. The purpose of this register is to study cancer as it occurs in Montana. A simple form has been designed for follow-up study through the reporting physician. The patients themselves will not be contacted directly. The committee asked that the cases be reported by name to prevent duplication and to allow a cross-check with death certificates to be carried out. The file is a confidential one, and is available for research only.

The reporting of cancer cases has been approved by the legal counsel of the Montana State Medical Association.

Lay Education Program

The Cancer committee of the State Medical Association has, as previously noted in this report, cooperated with Mrs. H. W. Peterson in her lay education work. Lay education continues to be the major objective of the American Cancer Society. This lay education program is designed to tell the people of Montana to consult their physicians early when any signs or symptoms of cancer are noted and to seek periodic examinations.

Physician Education Program

As physicians we are constantly in search of additional knowledge so that we may better treat our patients. In order to make new knowledge a part of every physician's armamentarium, the committee, acting with the financial aid of the Cancer Society, decided on three courses of action:

1. Secure an out-of-state speaker of distinction to make a tour of the state presenting papers on cancer.
2. Pay the expenses of Montana physicians to refresher courses on malignant diseases.
3. Set up a physicians' loan library.

All three programs have been carried out. (1) Dr. Frank B. Queen, professor of pathology, Oregon University Medical School, and director of cancer control in the state of Oregon, presented papers at Missoula, Butte, Billings, Glendive, Glasgow, Malta, Great Falls, and Helena. (2) The county medical societies were asked to select, by lot or otherwise, two physicians to attend refresher courses. (Expenses to be paid by the Montana Division of the American Cancer Society). All but two county societies have replied, and of those who replied all are participating in this program. The physicians attending the meetings have been requested to make reports to their respective county societies upon their return, thus furthering the educational program. (3) A free loan library was established. Unusual medical volumes are thus made available to the physicians of the state.

Patient Service Program

The Field Army workers of the Montana Division of the American Cancer Society have long felt the need for an active service program to care for medically indigent patients suffering from cancer. A service program was designed by the Executive committee. This program is not meant to replace existing agencies which aid medically indigent patients, but is meant to supplement the service available from these agencies. The program is administered in each instance by the family physician. The overall service program has been designed to aid the medically indigent cancer patient in obtaining adequate medical care. I wish to emphasize that the service program is not meant to supplant existing agencies aiding medically indigent patients. It supplements this aid. I would like to emphasize also that impartial credit exchanges are utilized in investigating each case. No funds are distributed unless the financial status of the patient is in the bracket which meets with the approval of the Cancer Committee of the State Medical Association.

RECOMMENDATIONS

The committee recommends to the House of Delegates that they approve the following program for the coming year:

1. A continuation of the reporting of cancer cases and a detailed analysis of the reported cases of cancer.
2. An extension of the lay education program in cooperation wtih the Montana Division of the American Cancer Society.
3. A continuation and augmentation of the physician education program through: (a) greater numbers of local meetings with papers on cancer by local and out-of-state physicians; (b) refresher courses, provided the present courses are deemed of value.
4. A continuation of the medically indigent patient service program as outlined.
5. The committee asks the opinion of the House of Delegates as to the advisability of establishing a free biopsy service for all patients.

Eugene Hildebrand, M.D., Chairman

Orthopedic Committee

1. The Children's Bureau has decided that the care of indigent rheumatic fever patients should come within the province of the Crippled Children's Division. This program is already operating on the national level and the Crippled Children's Division asked the Orthopedic committee for help in setting up the state program. As the care of rheumatic fever does not come within the scope of orthopedics and the need was urgent, your committee suggested as a temporary solution to the director of the Crippled Children's Division that a group of those physicians who especially render this type of service be used to initiate the program. The Orthopedic committee respectfully

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*See page 285 of this issue.

suggests the appointment of a permanent Rheumatic Fever and Heart committee.

2. In order to meet the recommendation of the A.C.S. hospital standardization committee it is highly recommended by your Orthopedic committee that each hospital staff appoint a fracture committee and that uniform fracture records be kept (malpractice).

3. It was decided that in order to promote uniformity in dealing with federal agencies that the fee schedule to be adopted for use between the Veterans' Administration and the Montana Physicians' Service be used as a basis for setting up of fees for services by all physicians rendered to the Crippled Children's Division.

J. K. Colman, M.D., Chairman
Louis W. Allard, M.D.
John C. Wolgamot, M.D.
Archie L. Gleason, M.D.
Thomas L. Hawkins, M.D.

Economics Committee

The Economics committee of the Montana State Medical Association reports as follows:

We have thoroughly investigated the Professional Credit Protective Bureau of Montana, affiliated with the I. C. System, and after such investigation it is our belief that this bureau is a reliable and responsible organization, which we can recommend to the membership of the Montana Medical Association.

This committee is cognizant of the fine work performed along educational lines, both as affects the laity and our profession, by the American Cancer Society, and heartily commends the same. However, it is the feeling of this committee that the funds of the American Cancer Society allocated to the diagnosis and treatment of cancer or suspected cancer should be utilized only for such purposes in cases of the indigent, provided that this is not to be construed as a criticism or an objection to the establishment of cancer detection centers or clinics. Such procedure as biopsies and treatment among those patients able to pay should be continued on the patient and physician relationship which now exists.

J. H. Garberson, M.D., Chairman
J. C. Shields, M.D.
Fred F. Attix, M.D.
I. J. Bridenstine, M.D.

Tuberculosis Committee

During the past two years considerable progress has been made in the control of tuberculosis. A Division of Tuberculosis Control has been set up in the State Board of Health which has been functioning efficiently during most of this time.

A rather comprehensive case-finding program has been carried out throughout a fair proportion of the state by the Division of Tuberculosis Control, with the aid of a mobile X-ray unit loaned to the State Board of Health by the Montana Tuberculosis Association. A fair number of active cases have been found, most of which are at the present time under treatment at the state sanitarium.

The administration of the Tuberculosis Control Division is being carried out by a physician on loan from the United States Public Health Service, and it is hoped that in the near future this division can be administered by a physician not connected with the United States Public Health Service and one who is, or has been, in practice in the state of Montana.

The Montana State Tuberculosis Association has contributed much to the tuberculosis control program by continuing to carry out their case-finding surveys and continuing to educate the public in tuberculosis.

The last legislature authorized the expenditure of $400,000 for a new unit at the state sanitarium, the monies to come from the postwar construction fund. It is hoped that this $400,000 can be augmented by a federal grant. This new unit is very much needed at the institution and will be helpful in treating the cases which the surveys are finding.

Due to both surgical and medical advancements in the treatment of tuberculosis in the past few years, namely streptomycin and surgical resection, more cases are being arrested.

The State Bureau of Rehabilitation has cooperated in every way in the rehabilitation of the tuberculous patient.

During this session a Montana Trudeau Society is being formed which will act as an advisory council to the various agencies which are functioning in tuberculosis control.

It is requested that every local medical society appoint a committee on tuberculosis which may function together with the state committee. If there is a local committee in each district, then it would be possible for the Tuberculosis Control Division to contact this committee and receive recommendations as to the program desired in that community. The committee also could aid very materially in the education of the community so that more people would have survey X-rays taken.

Recommendations:

1. Appointment of a tuberculosis committee in each county medical society. This committee is to advise and make recommendations as to survey procedures in their respective localities.

2. Appointment of a physician as director of the Division of Tuberculosis Control in the State Board of Health who is not connected with the United States Public Health Service; preferably one who is practicing, or has practiced, in the state of Montana.

F. I. Terrill, M.D., Chairman
A. R. Foss, M.D.
P. L. Eneboe, M.D.
E. M. Larson, M.D.
C. W. Lawson, M.D.

Necrology Committee

During the past year we have lost a number of our prominent physicians by death. They have contributed a great deal to the progress of medicine and to the welfare of the people of Montana, and their passing is a distinct loss to all of us.

Dr. Samuel Mott Souders, Red Lodge, August 29, 1946, age 73.
Dr. J. H. P. Guass, formerly of Lewistown, October 31, 1946, age 74.
Dr. Heber G. Morgan, Red Lodge, November 26, 1946, age 63.
Dr. Herbert A. Maillet, Great Falls, Dec. 1, 1946, age 69.
Dr. James W. Craig, Circle, December 28, 1946, age 69.
Dr. J. R. E. Sievers, Butte, January 13, 1947, age 76.
Dr. Daniel F. Clancy, Ennis, February 5, 1947, age 70.
Dr. Harold C. Joesting, Butte, February 18, 1947, age 42.
Dr. Charles B. Rodes, Butte, March 31, 1947, age 67.
Dr. Fred L. Andrews, Great Falls, April 18, 1947, age 68.
Dr. Robert A. Morrill, Sidney, April 1947, age 73.
Dr. Arthur C. Knight, Philipsburg, May 5, 1947, age 66.
Dr. George A. Windsor, Livingston, May 26, 1947, age 60.
Dr. Samuel E. Leard, Livingston, May 27, 1947, age 82.

E. D. Hitchcock, M.D., Chairman
S. A. Cooney, M.D.

Dentists', Pharmacists' and Nurses' Committee

Dentists: The Dental group reports that there has been approximately 10 per cent increase in the dentists in the state of Montana during the past year. The State Board of Health has obtained a director for the Dental Division during the past year, and an active program of public health dentistry is being developed.

Nurses: The Nursing Association reports that the total number of licenses issued in 1946 was 395, and the total renewed for 1947 up to June 20th, was 3,900. The number of nurses employed in the state, either full or part-time, at the present time, is 1,000. Schools of Nursing report 600 students in the schools taking nursing training. This is about one-half the number that were in training during the years 1943-1944. A marked shortage of nurses exists.

Pharmacists: A request was made to the Board of Pharmacy for any information that they wished to give the medical society, but no replies were received to the request.

B. K. Kilbourne, M.D., Chairman
B. C. Farrand, M.D.
B. R. Tarbox, M.D.

Legislative Committee

Report on bills before the 30th legislative assembly of Montana

BILLS KILLED

House Bill No. 62. This bill was offered for the purpose of subjecting Montana Hospital Service Association to the jurisdiction of the state insurance commissioner. It proceeded on the theory that such associations as Blue Cross were engaged in the business of insurance, required reserves to be set up upon an actuarial basis, rates to be determined and fixed by the insurance commissioner, in whom was lodged visatorial and inspection powers of considerable extent. The bill was killed by adoption of an adverse committee report from the house committee. Strenuous effort was made to revive it without success.

Substitute House Bill No. 425. This bill was a substitute for a bill originally introduced by Representative Hunter of Lewis & Clark county, which had for its purpose re-constituting the membership of the State Board of Health, reduced the number of physicians from five to two; it added a dentist, and filled the other four memberships from different public groups, including labor. The original measure was killed by an adverse committee report. The substitute simply reduced the present membership of physicians from five to four and substituted a dentist member for the physician member thus displaced. The substitute bill was also killed on adverse committee report. The Montana State Medical Association enjoyed the active cooperation of the Montana State Dental Association in beating back this legislation—even as to the dental member, because it was ascertained that the Montana State Dental Association had not formally requested such a change. This is a field that must be carefully watched, as the efforts to re-constitute the State Board of Health are persistent and sometimes pernicious.

BILLS PASSED

Senate Bill No. 70. This bill was offered by the Montana State Nurses Association and was presented as a complete re-writing of the Montana Nurses Practice Act, and repeal of existing sections, effective July 1, 1947. The bill sets up a State Board of Nurses Examiners consisting of five members (who take office on expiration of terms of present members) and thereafter are appointed for three years by the governor. The governor may appoint members from lists submitted by the Montana State Nurses Association, or at his pleasure appoint any qualified person. The governor insisted that his appointments must not be restricted to persons named or nominated in lists submitted by the association. The State Board of Nurses Examiners has full power to license, on examination or reciprocity, registered nurses who meet its requirements. The board is also given—and this is entirely new in Montana—authority to accredit schools of nursing, upon standards set by the act. All nurses are licensed directly by the board, and their certificates do not run from the governor, as under the old outmoded legislation. The law does not cover gratuitous nursing by friends of a sick person or member of the family. It does not cover the so-called "practical nurses," who are exempt, upon insistence of the governor, who vetoed a bill in 1947 because it assumed to regulate "practical nurses." The bill does not apply "to persons of Christian Science faith in care of the sick." The act is to be construed as forbidding any authority to nurses to practice medicine or surgery or any of the healing arts, unless nurses are specifically licensed to practice such arts in Montana. This bill is Chapter 253, Laws 1947.

House Bill No. 235. This bill is one of the two companion measures introduced for the purpose of bringing the state of Montana into proper relationship with the federal act, whose purpose is to provide grants-in-aid for hospital construction, maintenance and operation. The first requisite under the first federal act, was to set up a state system of licensing hospitals. After July 1, 1947, no person or governmental unit shall conduct a hospital in Montana without a license. The Montana State Board of Health is the licensing agency which will grant, deny or revoke licenses after appropriate hearings in such matters. In addition the governor is to appoint an Advisory Hospital Council to advise and consult with the State Board of Health in carrying out the administration of the act. This council shall consist of nine members, three of recognized ability in the field of non-governmental hospital administration, three of like ability in the field of medicine and surgery, nursing, public welfare and architecture, three with broad civic interests representing consumers of hospital services. This council must review and approve the rules and regulations of the State Board of Health before such rules and regulations become effective. The bill writes in, through Section 17, a provision forbidding discrimination by hospitals, "any of which are exempt or cause themselves to become exempt" from taxation, by the patient of any regularly licensed physician for or upon any ground or reason whatever, including the fact that any such physician is not a member of the medical or surgical or other staff, clinic or internal instrumentality of such hospital. All such hospitals are required and compelled to admit, receive and care for patients of any regularly licensed physician and surgeon under the same terms and conditions as may be established by the governing authority of the association for the patients of any other regularly licensed physician. The act does not prevent the maintenance of adequate hospital standards, safeguards and ethics. It merely affirms that the patients of any regularly licensed physician and surgeon shall be subjected to the same rules and regulations as the patients of any other physician and surgeon. The free and confidential professional relation between physician and patient is preserved by express language. The bill carries an appropriation of $15,000.00 for each of the years, July 1, 1947, to June 30, 1949. This bill is now Chapter 269, Laws of 1947, and became effective March 10, 1947.

House Bill No. 236. This is the companion measure to House Bill No. 235. It is known as the "Montana Hospital Survey and Construction Act." It is administered by the State Board of Health through a division of hospital survey and construction, whose duty it is to make an inventory of existing hospitals, survey the need for construction of hospitals and develop a program of hospital construction in cooperation with the requirements of Public Law 725 of the 79th Congress. Here, too, the governor is required to appoint an Advisory Council to assist the State Board of Health in carrying out the administration of the act. Applications for federal funds are to be made to the surgeon general by the board. The board shall prepare and submit to the surgeon general a state plan. The board is required to prescribe minimum standards for maintenance and operations of hospitals which receive federal aid. Funds received from the Federal government are to be transmitted to the appropriate groups where their applications have been approved. Two or more counties of the state may, by concurrent action, join in a consolidated application for funds. This bill has now become Chapter 270, Laws of 1947, and was effective March 10, 1947.

House Bill No. 353. This legislation affects Montana Physicians Service and Montana Hospital Service Association, and any other like organizations that may hereafter be established, by specifically classifying them as non-profit corporations and providing for their organization (in the case of new associations) and their continuance (in the case of the associations already existing and named above). Fundamentally, the act applies to all non-profit corporations in Montana, and presents completely re-written sections of the former non-profit corporation law. Existing unincorporated associations, or individuals, may form non-profit corporations under it, as well as health service corporations. At least one-fourth of all licentiates of the particular profession (such as the physicians and surgeons) or at least one-fourth of the whole number of the hospitals in the state, in the case of the hospital service corporations, must be members before any incorporation will be permitted. Membership in the corporation and opportunity to render service must be available on a uniform basis, and certificates must be issued to medical service plans by the Montana State Board of Medical Examiners and hospital service plans by the licensing agency of hospitals, i.e., the State Board of Health. All health service corporations, whether medical or hospital, are subjected to supervision by the particular professional board named for each group and, like all other corporations, their affairs are subject to examination to ascertain to what extent they may fail to comply, it at all, with the trusts which they have assumed, or to depart from their articles of incorporation. It specifically provided that the carrying on of business by any non-profit corporation upon a basis which may earn legitimate operating and administrative expenses, discharge the obligations of the corporation, contracted within the scope of its powers, and the distribution of assets to beneficial members in the event of dissolution is not forbidden to such non-profit corporations. This bill became effective March 11, 1947, as Chapter 283, Laws of 1947.

J. M. Flinn, M.D., Chairman
W. F. Cashmore, M.D.
R. W. Morris, M.D.
T. R. Vye, M.D.
R. C. Monahan, M.D.

History of Medicine Committee

Compiling of material for the first volume, *Pioneer Physicians of Montana,* to the year 1900 is complete. The material is ready for revising and indexing, which the American Medical Association has agreed to undertake. No funds are requested at this time. Your committee recommends, however, that it be given permission, if it seems advisable, to form a committee of one hundred (100) to sponsor the publication; to go ahead and solicit subscriptions for the volume. The publication has been delayed because of the war, rewrite personnel shortage, newsprint shortage, and costs.

It is hoped that the American Medical Association can now undertake the rewriting and indexing of this volume.

E. D. HITCHCOCK, M.D., Chairman
S. A. COONEY, M.D.

Reference Committee on the Constitution and By-Laws

Your reference committee has considered every suggestion submitted, either orally or written, and discussed each one carefully.

As has been pointed out to all members of the house, it is imperative that final action be taken at this annual session in order that the association can re-incorporate. We hope that this report will be accepted this morning in order to avoid an additional meeting of the House of Delegates this afternoon or this evening.

The proposed constitution and by-laws as previously published and mailed to each member of the association is recommended for adoption, as submitted, with the following changes which your reference committee approves:

1. Article 6, page 1, we recommend the addition of the Vice-President to the Council and the omission of the immediate Past President.

2. We recommend on page 2, Article 8, Section 6, the insertion of a clause "as provided for in the By-Laws," after the words "Executive Committee," so there can be no misunderstanding of the creation of this committee.

3. We recommend that the word "By-Laws" be substituted for the word "Constitution" on page 2, Article 9, as this was obviously an error in publishing the proposal.

4. We recommend on page 3, Article 10, the exclusion of reference to the dues so that the dues may be left entirely to the discretion of the House of Delegates.

5. We recommend on page 4, Chapter 2, Section 4, that 20 delegates representing at least one-half of the component societies constitute a quorum, since the originally published version might have made it too difficult to obtain a quorum of the House of Delegates.

6. We recommend on page 5, Chapter 3, under Election of Officers, that the first paragraph be reworded as follows:

> "All officers, except the councilors, shall be elected at the annual session of the House of Delegates of the Association. This election is to be held not sooner than the meeting following the one at which the nominations were presented to the House of Delegates and posted by the Secretary."

This was changed from the 24 hour requirement because it might become necessary at some emergency to hold a one-day annual session as we did during the war.

We also recommend that the last paragraph of Chapter 3, which appears at the top of page 6, be amended, striking out the last sentence and substituting the following words:

> "A majority of all votes cast shall be necessary to elect. In the event no candidate receives a majority on the first ballot, the candidate receiving the fewest votes shall be dropped and the ballot shall be spread again, ballotting proceeding in this manner until an election is had."

7. We recommend on page 6, Chapter 4, Section 5, that the first sentence be worded as follows:

> "The Secretary-Treasurer shall attend the meetings of the House of Delegates and shall keep minutes of its proceedings. He shall also provide for keeping a record of the proceedings of the Scientific Sessions."

This recommendation is made because of the obvious impossibility of one person attending two meetings which might at some time coincide.

8. We recommend on page 7, Chapter 6, Section 1, under Committees that instead of stating that the committees number 10 and 6 specifically, that these requirements shall be as follows:

> "There will be two groups of committees. The Business Group shall consist of the following committees and such others as the President or the House of Delegates find necessary."
>
> "The Scientific and Educational Group shall consist of the following committees and such others as the President or the House of Delegates find necessary."

We also recommend the omission of (J), the Medical Publications Committee, and the addition of (J), the Auditing Committee. We also recommend the addition of (Q), the Rheumatic Fever and Heart Committee, to conform to the action of the House of Delegates taken yesterday.

9. We recommend in Chapter 6, Section 3, that all committees shall consist of five or more members instead of being limited to five members.

10. Also, we recommend on page 8, Section 4, Paragraph E, that the last two sentences be deleted and replaced by the following:

> "This Committee shall be a liaison between the Montana State Medical Association and any other Association, League or Society working with the same professed purposes. It shall advise the House of Delegates as to what expenditures, if any, it believes should be made to the support of such work." This was done in order that reference not be made to specific organizations.

11. We further recommend that on page 9, Section 4, Paragraph I, Nominating Committees, the paragraph be changed to read as follows:

> "The Nominating Committee shall consist of five members of the State Association appointed by the President at least thirty days prior to the annual session, no two of whom shall be from the same Councilor District. This Committee shall submit its nominations to the House of Delegates for the elective offices as follows: President-Elect, Vice-President, Secretary-Treasurer, and every even-numbered year a delegate and an alternate-delegate to the American Medical Association. The Nominating Committee shall also nominate candidates, who shall be members of the House of Delegates, for the two vacancies on the Executive Committee. It is recommended that for one of these candidates on each vacancy, that the immediate past presidents be considered if they are able to serve. The Association will annually submit to the Governor of the State of Montana a list of physicians' names from which he will be asked to make his appointments to the State Board of Health. There shall be nominated five persons for each vacancy on the State Board of Health."

12. On page 9, Chapter 6, Section 4, Paragraph J, we recommend that this paragraph be deleted and the following inserted:

> "J. Auditing Committee. This committee shall be charged with examining the books of the Secretary-Treasurer prior to each annual session, satisfying themselves that the books are properly kept and reporting their findings to the House of Delegates."

13. We recommend that on page 10, Chapter 6, Section 4, an additional paragraph be added to read as follows:

> "Q. Rheumatic Fever and Heart Committee. This committee shall study problems related to the care and treatment of Rheumatic Fever and disorders of the heart, shall cooperate with Federal and State agencies interested in these conditions. It shall be prepared to furnish members of the Association with information relative to the most desirable methods of treatment of Rheumatic Fever and disorders of the heart and shall cooperate with approved national and local organizations interested in Rheumatic Fever and disorders of the heart."

Your Reference Committee devoted the entire afternoon to consideration of these matters with the assistance of several interested delegates and officers who offered valuable suggestions. We sincerely believe that adoption of these recommendations and of the amended Constitution and By-Laws will work to the lasting benefit of the Montana State Medical Association. We, therefore, hope that the remainder of the House of Delegates agrees with us.

R. F. Peterson, M.D., Chairman
J. H. Garberson, M.D.
T. R. Vye, M.D.
H. W. Gregg, M.D.
T. F. Walker, M.D.

Committee on Preparedness

The Committee on Preparedness reports that at the present time there are approximately ten naval reserve medical officers and thirty-three army medical reserve corps officers in the state. It is respectfully suggested that all doctors of forty-five years and younger become members of either reserve corps, and it is suggested that they continue as active members of either group until they have reached the age of fifty. It is certainly to the advantage of any doctor to obtain as much credit as possible for length of service, for the government will in all probability in the event of any crisis, induct medical men into the service, whether they desire it or not. It is to the advantage therefore of the doctor to have as much longevity in the reserve corps as possible. It is realized by the committee that the subject of preparedness is not a very popular one at the present time and the above recommendation is therefore the only one made.

Edward S. Murphy, M.D., Chairman

Rural Health Committee

The meeting of the National Conference on Rural Health, February 7 and 8, 1947, sponsored by the American Medical Association in cooperation with representative farm organizations was well attended by physicians and members of farm organizations and Granges.

The problem of hospitals in rural areas was given a good deal of discussion. Some held that a hospital of less than fifty beds was inadequate and not acceptable. Others held that rural hospitals, where needed, could be of ten to twelve beds, would be the solution, and that these smaller hospitals would be suitable to handle obstetrical cases and emergencies, until the emergencies could be transported to larger hospital centers. The question arose of staffing these hospitals and maintaining them, since no hospital was good unless adequately staffed and financed. As one physician stated, "We find ghost towns in rural areas, and it would be too bad if we also had ghost hospitals." Before establishing a hospital in a rural area there should first be made a survey to determine whether a hospital is needed in the area, whether it can be suitably staffed and maintained so it will survive and not become a ghost hospital.

As to physicians being placed in rural areas—some held that the farmer did not have adequate medical service because of the distance to a physician. Some gave the solution to this problem with several suggestions: (1) Get students from the rural areas to study medicine. (2) Have students take up practice with a rural practitioner before completing their medical course. However, Dr. Shoulders, speaking at the luncheon, stated that the solution for the rural areas was not a doctor at every crossroad, but good roads and ambulance service. The director of Rural Health of Missouri gave his views for getting doctors to locate in rural areas as follows: (1) A rather high level of income for the community. (2) A system of good roads. (3) Good living conditions, such as modern homes, good offices, good schools and good community life. (4) Confidence in, and use of local doctors by residents of the area. (5) Hospital facilities in or near by for diagnostic and treatment purposes. (6) Modern Health Centers doing a good job of health education and good enrollment in Hospital and Prepayment Medical Services.

It was also suggested that in order to make any plans for rural medical service, farm groups and the medical profession meet in local communities and talk over conditions and plans, instead of having meetings in states or counties, so that medical plans could be approved by the consumer as well as by the profession. That the medical profession sponsor programs for preventative medicine for people in the rural areas. Other suggestions were made as follows: Full-time county health officers, with adequate pay. Establishment of health councils in rural areas. Talks by general practitioners to medical students on general practice in the country.

Dr. Fred A. Humphrey, chairman, Committee on Rural Medical Service in Colorado, gave the following suggestions and recommendations as methods of bringing and holding doctors in rural areas:

To the Rural Committee: That they build and maintain good roads from farm to market.

That they educate themselves on public health matters and put into practice known disease preventing measures.

That they improve their living conditions.

That they have in their areas persons trained in first aid and home nursing.

That in some instances they furnish for the doctor the needed facilities, such as equipment and office headquarters. A subsidy may even be necessary in some instances.

That they apply to the proper agency of their state for assistance under the Hill-Burton Act if financial aid is required to carry on their program.

That they participate in prepayment insurance plans.

That they patronize their local doctor, and whenever possible, conserve his time by going to his office.

To the Medical Profession: That they require three to five years general practice before resident training is begun.

That certification boards give credit for such time spent in general practice.

That hospitals establish residencies in general practice.

That students from rural areas be encouraged to study medicine.

That hospital staffs be open to men in general practice.

That the system of medical care to soldiers be adapted to rural medical care.

The full report of the committee meeting can be seen in the *Journal* of the American Medical Association for March 15th and March 22nd, 1947.

E. M. Gans, M.D., Chairman

Public Relations Committee

The Public Relations committee attended a joint meeting with the Executive committee in Helena, Montana, in the autumn of 1946. It was decided at this meeting that the name of Reverend Father Anthony Ravalli, S.J., father and first physician and surgeon of Montana, should be submitted to the American Medical Association committee in charge of the radio program, "Doctors—Then and Now."

The American Medical Association broadcast a program on March 22, 1947, entitled "Doctors—Then and Now" which honored the mountain states of Colorado, Utah, Idaho, Wyoming and Montana. The script chosen had as its subject the Reverend Father Anthony Ravalli, S.J. At the end of the broadcast, which portrayed several of the events of Father Ravalli's life relating to the practice of medicine in the mountains, Dr. Amess of Denver made a brief talk.

Dr. E. S. Murphy was delegated to submit the historical data to the national committee. As you know, Father Ravalli and the data submitted by Dr. Murphy was dramatized and delivered from Denver, Colorado, over NBC. Dr. Ravalli was chosen as a representative physician of all the northwestern states. The delivery and the dramatization over NBC was excellent.

The press throughout the state as well as the radio stations have been most helpful in regard to public relations. Both have given much space and time to the centennial anniversary of the American Medical Association, not only in the news items, but in editorials.

We were also delegated to carry out a collection program for the National Physician's Committee. We are of the opinion that the National Physician's Committee has been of great service to the doctors of the state in distributing literature in regard to national medical legislation, in looking after our committee, Doctors Cooney and Foss, on a trip to St. Louis, and later in hearings in Washington, D. C., before the senate committee.

Checks have been mailed to Dr. E. S. Murphy, and myself, and then these checks were forwarded to Chicago to the national committee to the amount of $2,510.00. There were several physicians in the state who mailed their contributions directly to the national committee in Chicago.

Your Public Relations committee recommended that the Montana Medical Association contribute $350 to the United Public Health League.

J. C. Shields, M.D., Chairman
E. S. Murphy, M.D., Secretary-Treasurer
J. M. Flinn, M.D.
R. D. Knapp, M.D.
J. H. Bridenbaugh, M.D.
J. C. MacGregor, M.D.
R. L. Towne, M.D.

Maternal and Child Health Committee

The Maternal and Child Health committee has held three meetings during the year 1946-47. A subcommittee for postgraduate education was selected to contact prospective lecturers. This problem was not as easily answered this year as usual. However, one lecturer was obtained during the year. Dr. R. D. Reekie of Spokane gave twelve lectures in six communities. The subjects were "Toxemia of Pregnancy," "Infections Associated with Pregnancy," and "Hemorrhages Associated with Pregnancy."

The subcommittee on premature care reported results on the premature care station in the Montana Deaconess Hospital. This program was carried out with the aid of the Maternal and Child Health Division of the State Board of Health. Comparative studies showed that there was a definite saving of lives in the premature infant weighing 1500 grams or more. These studies were made at the hospital on infants born prior to and after the creation of the premature station. The committee recommends that hospitals seriously consider similar arrangements and if possible create similar premature stations throughout the state. It was announced that a limited number of incubators are available through the Maternal and Child Health Division for use in the smaller hospitals. It is hoped to encourage better premature and new-born care.

A nurse from the Maternal and Child Health Division of the State Board of Health is available to hospitals for consultation, nursing service for obstetrical and new-born units in hospitals.

The Maternal and Child Health Committee supported the nurses activities with the following recommendations:

1. That proper identification of infants be used in all hospitals. Beads were considered to be the best.
2. Hand washing facilities should be present in all nurseries.
3. Boric acid stock solution in obstetrical departments is considered to be of little value for routine use.
4. All equipment necessary for emergencies in obstetrical practice should be on hand, sterile, and readily available in delivery rooms of all hospitals.
5. Premature centers should be developed in the state through active discussion and encouragement at the hospital staff meetings.

The Maternal and Child Health Committee sponsored the premarital Wassermann bill which was passed in the 1947 legislature.

Considerable time at the meetings was utilized in discussing case reports of maternal mortality studies carried out by the Maternal and Child Health Division of the State Board of Health. From January 1, 1940, to December 31, 1946, there were 191 maternal deaths or deaths associated with pregnancy reported to the division of vital statistics of the State Board of Health. Study revealed that five of these did not result from pregnancy, leaving 186 cases for the study. Time and personnel would not permit matching birth and death certificates. There were probably more deaths of this nature during that period. The investigator was informed of two maternal deaths not reported.

During the same interval there were 79,576 live births giving an uncorrected maternal mortality of 2.34 per 1,000 live births. Thirty-five of these deaths were classified as associated with pregnancy. If these were eliminated, our maternal mortality would be 1.89 per 1,000 live births. There has been a steady decrease in maternal mortality yearly from 3.35 to 1.29 per 1,000 live births.

There was a slightly higher incidence of maternal deaths in late winter and spring than in fall and early winter.

Twenty-two of the deaths were Indians. Three of six cases of tuberculosis were Indians, and three of six cases unattended at the time of delivery were Indians.

120 of the 186 deaths were delivered in hospitals. This is an incidence of 64.5 per cent. 173, or 93 per cent, died in a hospital.

An important lack was noted in this study. In the 186 deaths only 41 consultations were obtained. It was notable that there was very little expert consultation even when such consultation was available.

In 38.6 per cent of the entire group a live baby was delivered. 10.5 per cent died undelivered. Only 14.5 per cent, or 27 cases, had any kind of postmortem examination. Four of these were coroner's autopsies and two postmortem cesarean sections. Causes of death were as follows:

- Toxemia of pregnancy—30
- Infection—64 (27 of these were septic abortions)
- Hemorrhage and shock—44
- Anesthesia deaths—3
- Non-obstetrical deaths—27
    - Cardiac complications with cardiac failure—12
    - Tuberculosis—6
    - Pneumonia—3
    - Intestinal obstruction (mechanical)—2
    - Mesenteric thrombosis—2
    - Influenza—2

In the 91 patients, there were 103 operations. These operations are listed as follows: Forceps—36; versions—6; breech—6; manual dilatation of cervix—7; cesarean section—19 (non-elective—11); uterine packing—1.

The Maternal and Child Health committee has also reviewed pamphlets used in instructing the public health nurse in certain definite procedures. The subjects covered are infant care; well child conferences; policies and procedures for maternity nursing service; standing orders and approval for educational content for public health nursing, maternity, and infant service; and standing orders in general for public health nurse.

Frank L. McPhail, M.D., Chairman

REPORT OF THE SIXTH ANNUAL MEETING OF THE WOMAN'S AUXILIARY TO THE MONTANA STATE MEDICAL ASSOCIATION

Officers for 1947-48

President	Mrs. Harold Schwartz, Butte
President-elect	Mrs. H. V. Gibson, Great Falls
1st Vice President	Mrs. W. F. Cashmore, Helena
2nd Vice-President	Mrs. H. J. Hall, Missoula
Secretary	Mrs. Robert Kroeze, Butte
Treasurer	Mrs. A. A. Dodge, Kalispell

Board of Directors:

Mrs. C. H. Fredrickson, Missoula
Mrs. R. J. Holzberger, Great Falls
Mrs. C. W. Lawson, Havre
Mrs. R. G. Johnson, Harlowton
Mrs. R. V. Morledge, Billings

The sixth annual meeting of the Woman's Auxiliary to the Montana State Medical Association was called to order by the president, Mrs. Roy V. Morledge, Billings, June 26, 1947, in Missoula. Mrs. Eustace A. Allen of Atlanta, Georgia, national president, was an honor guest at a luncheon given in the Hotel Florence on Friday, June 27. Mrs. J. P. Ritchey, past state president, and also an honor guest at the luncheon, was given the first honorary life membership of the auxiliary for "outstanding services and promotion" of the organization. The auxiliary convention opened with a board of directors meeting at 10 o'clock on June 26. Annual reports of the state officers, committee chairman and county presidents were presented to the assembly on Thursday and Friday, June 26 and 27. Guest speakers were Mrs. Verna Carlisle, child development specialist and a member of the professional staff of the National Society for Crippled Children, Dr. J. P. Ritchey, Dr. M. A. Shillington, Dr. James D. Morrison, Dr. L. W. Allard, and Mrs. Eustace A. Allen.

Montana State Medical Association Roster . . . 1947

MEMBERSHIP BY DISTRICTS

CASCADE COUNTY MEDICAL SOCIETY

F. H. Crago, Pres.	Great Falls
G. A. Sexton, V. Pres.	Great Falls
L. L. Maillet, Treas.	Great Falls
Adams, Ellis	Great Falls
Allred, I. A.	Great Falls
Anderson, C. E.	Great Falls
Bateman, H. W.	Choteau
Bresee, C. J.	Great Falls
Bulger, J. J.	Great Falls
Crago, F. H.	Great Falls
Crary, L. S.	Fairfield
Davis, R. C.	Great Falls
Durnin, R. B.	Great Falls
Fuller, H. W.	Great Falls
Gibson, H. V.	Great Falls
Gleason, A. L.	Great Falls
Greaves, J. P.	Great Falls
Hall, C. M.	Great Falls
Hall, E. L.	Great Falls
Hanley, J. C.	Great Falls
Hildebrand, E.	Great Falls
Hitchcock, E. D.	Great Falls
Hodgson, E. R.	Great Falls
Holzberger, R. J.	Great Falls
Howard, L. L.	Great Falls
Hurd, F. D.	Great Falls
Irwin, J. H.	Great Falls
Johnson, A. C.	Great Falls
Keenan, F. E.	Great Falls
Keenan, M. E.	Great Falls
Keenan, T. M.	Great Falls
Larson, E. M.	Great Falls
Layne, J. A.	Great Falls
Little, C. F.	Great Falls
Logan, P. E.	Great Falls
Lord, B. E.	Great Falls
Magner, Chas.	Great Falls
Maillet, L. L.	Great Falls
MacBurney, L. R.	Great Falls
MacGregor, J. C.	Great Falls
McGregor, H. J.	Great Falls
McGregor, J. F.	Great Falls
McGregor, R. J.	Great Falls
McPhail, F. L.	Great Falls
McPhail, Malcolm	Great Falls
Mortensbak, H. E.	Great Falls
Nagel, C. E.	Great Falls
Richardson, R. B.	Great Falls
Russell, Rosannah (Honorary member)	Fort Shaw
Schemm, F. R.	Great Falls
Sandmeyer, J. A.	Great Falls
Setzer, G. W.	Malta
Sexton, G. A.	Great Falls
Strain, Earle	Great Falls
Templeton, C. V.	Great Falls
Walker, Dora	Great Falls
Walker, T. F.	Great Falls
Waniata, F. K.	Great Falls
Weisgerber, A. L.	Great Falls
Williams, W. T.	Malta
Wolgamot, J. C.	Great Falls

CHOUTEAU COUNTY MEDICAL SOCIETY

E. L. Anderson, Pres.	Ft. Benton
E. L. Anderson, Sec.-Treas.	” ”
Anderson, E. L.	Ft. Benton
McDede, J. S.	Ft. Benton

FERGUS COUNTY MEDICAL SOCIETY

Jas. A. Mueller, Pres.	Lewistown
Paul J. Gans, Sec.-Treas.	Lewistown
Alexander, J. L. (Life member)	Winnett
Attix, F. F.	Lewistown
Dion, R. H.	Lewistown
Eck, R. L.	Lewistown
Freed, Hazel	Stanford
Gans, E. M.	Harlowton
Gans, P. J.	Lewistown
Herring, J. H.	Lewistown
Johnson, R. G.	Harlowton
Mueller, J. A.	Lewistown
Porter, E. S. (Life member)	Lewistown
Schubert, J. W.	Lewistown
Welden, E. A.	Lewistown

FLATHEAD COUNTY MEDICAL SOCIETY

V. A. Weed, Pres.	Kalispell
T. B. Moore, Jr., V. Pres.	Kalispell
R. A. Benke, Sec.	Kalispell
R. L. Towne, Treas.	Kalispell
Benke, R. A.	Kalispell
Brassett, A. J.	Kalispell
Burns, M. O.	Kalispell
Cairns, J. M.	Libby
Clark, C. A.	Eureka
Cockrell, E. P.	Kalispell
Conway, W. Q.	Kalispell
Dimon, John M.	Polson
Dodge, A. A.	Kalispell
Ferree, V. D.	Kalispell
Griffis, L. G.	Kalispell
Huggins, H. D.	Kalispell
Lees, A. T.	Whitefish
Leitch, Neil	Kalispell
Marks, John E.	Whitefish
Moore, T. B., Jr.	Kalispell
Paul, F. W.	Kalispell
Ross, F. B.	Kalispell
Simons, J. B.	Whitefish
Stewart, R. M.	Whitefish
Tanglin, W. G.	Polson
Taylor, W. W.	Whitefish
Towne, R. L.	Kalispell
Weed, V. A.	Kalispell
Wright, G. B.	Kalispell

GALLATIN COUNTY MEDICAL SOCIETY

B. J. Heetderks, Pres.	Bozeman
R. G. Keeton, V. Pres.	Bozeman
D. C. Epler, Sec.-Treas.	Bozeman
Bole, W. S. (Life member)	Bozeman
Brewer, A. D.	Bozeman
Bradbury, J. T. (Honorary member)	Willow Creek
Craft, C. B.	Bozeman
Eiriksson, C. E.	Bozeman
Eneboe, Paul	Bozeman
Epler, D. C.	Bozeman
Grigg, E. R.	Bozeman
Hammer, C. W.	Bozeman
Heetderks, B. J.	Bozeman
Kearns, E. J.	Bozeman
Keeton, R. G.	Bozeman
Sabo, F. I.	Bozeman
Scherer, R. G.	Bozeman
Seerley, C. C.	Bozeman
Seitz, R. E.	Bozeman
Sigler, R. R. (Life member)	Bozeman
Smith, C. S.	Bozeman
Vadheim, A. L., Jr.	Bozeman
Whitehead, C. E.	Bozeman
Williams, R. A.	Bozeman
Yeatts, R. O.	Bozeman

HILL COUNTY MEDICAL SOCIETY

F. W. Aubin, Pres.	Havre
D. J. Almas, V. Pres.	Havre
C. W. Lawson, Sec.-Treas.	Havre
Almas, D. J.	Chinook
Aubin, F. W.	Havre
Davis, M. R.	Harlem
Forster, W. L.	Havre
Hamilton, W. F.	Havre
Hoon, A. S.	Chinook
Houtz, C. S.	Havre
Jestrab, G. A.	Havre
Johnson, M. E. K.	Chester
Lacey, Wm. A.	Havre
Lawson, C. W.	Havre
★Leeds, Robert	Chinook
MacKenzie, D. S.	Havre
MacKenzie, D. S., Jr.	Havre
W. A. McCannel	Chinook
Rapp, V. W.	Ft. Belknap

LAKE COUNTY MEDICAL SOCIETY

(Temporarily discontinued)

French, E. J.	Edmonton, Alta., Canada (Life member)
Venneman, F. W.	Ronan

LEWIS & CLARK COUNTY MEDICAL SOCIETY

E. H. Lindstrom, Pres.	Helena
J. J. McCabe, V. Pres.	Helena
A. R. Little, Sec.-Treas.	Helena
Bayles, R. G.	Townsend
Berg, D. T.	Helena
Campbell, R. M.	Helena
Cashmore, W. F.	Helena
Cooney, S. A.	Helena
Cooney, T. W.	Helena
Courtney, D. L.	Helena
Flinn, J. M.	Helena
Gallivan, E. L.	Helena
Hawkins, T. L.	Helena
Kilbourne, B. K.	Helena
Klein, O. G.	Helena
Levitt, Louis	Boulder
Lindstrom, E. H.	Helena
Little, A. R.	Helena
McCabe, J. J.	Helena
McElwee, W. R.	Townsend
Mears, Claude M.	Helena
Monserrate, D. N.	Helena
Moore, O. M.	Helena
Morgan, R. M.	Helena
Morris, R. W.	Helena
Nash, F. P.	Townsend

MADISON COUNTY MEDICAL SOCIETY

L. R. Packard, Pres.	Whitehall
Dyer, R. H., Sec.-Treas.	Sheridan
Burns, W. J.	Twin Bridges
Dyer, R. H.	Sheridan
Farnsworth, R. B.	Chicago, Ill.
Packard, L. R.	Whitehall
Rossiter, H. D.	Sheridan
Seidensticker, J. C.	Twin Bridges

MOUNT POWELL COUNTY MEDICAL SOCIETY

L. G. Dunlap, Pres.	Anaconda
J. J. Malee, V. Pres.	Anaconda
E. A. Dolan, Sec.-Treas.	Anaconda
Beasley, W. A.	Galen
Benjamin, L. M.	Deer Lodge
Dolan, E. A.	Anaconda
Donich, G. M.	Anaconda
Dunlap, L. G.	Anaconda
Enochs, R. J.	Galen
Holmes, G. V.	Warm Springs
Kargacin, T. J.	Anaconda
Long, W. E.	Anaconda
Lyons, C. R.	Drummond
Malee, J. J.	Anaconda
Moffett, G. J.	Deer Lodge
Nesbitt, L. A.	Philipsburg
O'Rourke, J. L.	Anaconda
Pampel, B. L.	Warm Springs
Place, B. A.	Warm Springs
Terrill, F. I.	Galen
Trobough, G. E.	Anaconda
Tyler, K. A.	Galen
Unmack, F. L.	Deer Lodge

MUSSELSHELL COUNTY MEDICAL SOCIETY

S. A. Crouse, Pres.	Roundup
A. A. Bennett, V. Pres.	Roundup
G. A. Lewis, Sec.-Treas.	Roundup
Bennett, A. A.	Roundup
Crouse, S. A.	Roundup
Fouts, E. R.	Ryegate
Lewis, G. A.	Roundup
Lewis, R. O.	Roundup
O'Neill, R. T.	Roundup

NORTHCENTRAL MONTANA MEDICAL SOCIETY

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P. S. Cannon, V. Pres.	Conrad
W. L. DuBois, Sec.-Treas.	Conrad
Cannon, P. S.	Conrad
DuBois, W. L.	Conrad
Elliott, L. L.	Cut Bank
Logan, J. O.	Sunburst
Neraal, P. O.	Cut Bank
Olsen, N. A.	Cut Bank
Paterson, W. F.	Conrad
Power, H. W.	Conrad
Robinson, W. C.	Shelby
Waller, Geo. D.	Cut Bank
Whetstone, S. D.	Cut Bank

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J. T. Hurly, V. Pres.	Glasgow
P. A. Smith, Sec.-Treas.	Glasgow
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Benson, O. G.	Plentywood
Cockrell, T. L.	Hinsdale
Hurly, J. T.	Glasgow
Knapp, R. D.	Wolf Point
Knierim, F. M.	Glasgow
Krogstad, L. T.	Wolf Point
Pronin, Arthur	Plentywood
Ryde, R. E.	Glasgow
Smith, A. N.	Glasgow
Smith, P. A.	Glasgow

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W. E. Harris, V. Pres.	Livingston
E. M. Larson, Sec.-Treas.	Livingston
Baskett, L. W.	Big Timber
Claiborn, D. R.	Big Timber
Cogswell, W. F. (Life member)	Helena
Harris, W. E.	Livingston
Larson, E. M.	Livingston
Lueck, A. M.	Livingston
March, J. A.	Livingston
Pearson, J. A.	Livingston
Townsend, G. A.	Emigrant
Walker, R. E.	Livingston

SILVER BOW COUNTY MEDICAL SOCIETY

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J. K. Colman, V. Pres.	Butte
S. V. Wilking, Sec.	Butte
C. R. Canty, Treas.	Butte
Atkins, D. A.	Butte
Bell, R. F.	Dillon
Brancamp, J. H.	Butte
Burton, F. H.	Butte
Canty, C. R.	Butte
Casebeer, H. L.	Butte
Casebeer, R. L.	Butte
Colman, J. K.	Butte
Duchesneau, F. P.	Butte
Firsbee, J. B.	Butte
Garvey, J. E.	Butte
Gillespie, D. L.	Butte
Gold, M. A.	Butte
Gregg, H. W.	Butte
Hill, R. J.	Whitehall
Horst, C. H.	Butte
James, H. H.	Butte
Kane, J. J.	Butte
Kane, P. E.	Butte
Kane, R. C.	Butte
Karsted, A.	Butte
Kroeze, R.	Butte
Lapierre, J. C.	Butte
Lhotka, J. F.	Butte
MacPherson, G. T.	Butte
Matthews, Vida J.	Butte
McGill, Caroline	Butte
McMahon, E. S.	Butte
Monahan, R. C.	Butte
Mondloch, J. L.	Butte
Odgers, S. L.	Butte
O'Keefe, N. J.	Butte
Pemberton, C. W.	Butte
Peterson, R. F.	Butte
Poindexter, F. M.	Dillon
Routledge, G. L.	Dillon
Saam, T. W.	Butte
Schwartz, H.	Butte
Shields, J. C.	Butte
Sievers, A. R.	Butte
Spurck, P. T.	Butte
Stanchfield, H.	Dillon
Stephan, W. H.	Dillon
Thompson, F. M.	Columbia City, Ind.
Ungherini, V. O.	Butte
Van Veen, F. L.	Ennis
Wilking, S. V.	Butte

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R. W. Spicher, V. Pres.	Terry
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Benson, R. D.	Sidney
Blakemore, W. H. (Life member)	Baker
Danskin, M. G.	Glendive
Farrand, B. C.	Jordan
Garberson, J. H.	Miles City
Harlowe, H. D.	Miles City
Harper, R. D.	Sidney
Haywood, Guy T.	Forsyth
Hogeboom, C. F.	Baker
Howard, Elna M.	Miles City
Huene, H. J. (Life member)	Forsyth
Hyde, R. A.	Sidney
Lindeberg, Sadie B.	Miles City
Low, John E. (Retired)	Sidney
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Noonan, E. F.	Wibaux
Olson, S. A.	Glendive
Polk, R. W.	Miles City
Pratt, S. C.	Miles City
Randall, R. R.	Miles City
Robbins, B. L.	Glendive
Rowen, E. H.	Miles City
Sandy, B. B.	Ekalaka
Shillington, M. A.	Glendive
Spicher, R. W.	Terry
Tarbox, B. R.	Forsyth
Thompson, J. R.	Miles City
Weeks, S. A.	Baker
Winter, M. D.	Miles City

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Babcock, D. W.	Missoula
Bangeman, J. O.	Missoula
Blegen, H. M., Jr.	Missoula
Bourdeau, C. L.	Missoula
Boyer, Esther L.	Missoula
Brewer, L. W.	Missoula
Bridenstine, I. J.	Missoula
Brooke, C. P.	St. Ignatius
Brooke, J. M.	Ronan
Carmichael, G. A.	Missoula
Copsey, Harvey	Missoula
Doyle, W. J.	Superior
Farabaugh, C. L.	Missoula
Foss, A. R.	Missoula
Fredrickson, C. H.	Missoula
George, E. K.	Missoula
Gordon, D. A.	Hamilton
Guilfoyle, E. J.	Missoula
Hall, H. J.	Missoula
Harris, W. E.	Missoula
Hayward, Herbert	Hamilton
Holmes, J. T. (Life member)	Missoula
Honeycutt, C. F.	Missoula
Key, R. W.	Missoula
King, F. Ervin	Missoula
Kintner, A. R.	Missoula
Kuffel, Leonard	Missoula
Lowe, F. H.	Missoula
Marshall, W. J.	Missoula
McPhail, W. N.	Missoula
Meis, Armon M.	Hamilton
Morrison, W. F.	Missoula
Murphy, E. S.	Missoula
Nelson, J. M.	Missoula
Pease, F. D. (Life member)	Missoula
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Preston, S. N.	Missoula
Rew, A. W. (Life member)	Thompson Falls
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Rosdahl, C. E.	Missoula
Sale, G. G.	Missoula
Svore, C. R.	Missoula
Tefft, C. C.	Hamilton
Thornton, C. R.	Missoula
Trenouth, S. M.	Missoula
Turman, G. F.	Missoula
Weber, R. D.	Missoula
★Willis, Park, Jr.	Hamilton
Yuhas, J. L.	Missoula

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H. E. McIntyre, V. Pres.	Billings
R. E. Smalley, Sec.	Billings
J. J. Hammerel, Treas.	Billings
Adams, E. M.	Red Lodge
Allard, L. C.	Billings
Allard, L. W.	Billings
Anderson, M. O.	Hardin
Barrow, L. A.	Billings
Beal, R. L.	Red Lodge
Beltzer, C. E.	Washoe
Benson, R. E.	Billings
Benson, T. J.	Fromberg
Biehn, R. H.	Billings
Blackstone, A. V.	Absarokee
Bridenbaugh, J. H.	Billings
Bridenbaugh, R. B.	Bridger
Bridenbaugh, R. N.	Bridger
Brogan, H. E.	Miles City
Brogan, R. E.	Billings
Calvert, M. W.	Laurel
Caraway, H. T.	Billings
Carey, W. R.	Rosebud, S. Dak.
Chapple, R. R.	Billings
John DeCanio	Sisseton, S. Dak.
DeMers, J. J.	Huntley
Drew, H. O.	Billings
Dunkle, Frank	Absarokee
Farr, E. M.	Billings
Gerdes, Maude M.	Billings
Gordon, Wayne	Billings
Graham, J. H.	Berkeley, Calif.
Griffin, P. E.	Billings
Hagen, W. H.	Billings
Hagmann, E. A.	Billings
Hall, E. C.	Laurel
Hammerel, A. L.	Billings
Hammerel, J. J.	Billings
Hodges, D. E.	Billings
Hynes, J. E.	Billings
Irwin, C. E.	Billings
Kronmiller, E. V.	Billings
Kronmiller, L. H.	Billings
Labbitt, L. H.	Hardin
Larson, K. D.	Billings
Larson, R. A.	Billings
MacDonald, D. J.	Billings
McIntyre, H. E.	Billings
Marks, F. S.	Billings
Martin, May E.	Billings
Means, R. R.	Red Lodge
Morledge, R. V.	Billings
Morrison, J. D.	Billings
Morrison, W. R. (Retired)	Billings
Movius, A. J.	Billings
Movius, A. J., Jr.	Billings
Movius, W. R.	Billings
Nelson, C. H.	Billings
Neville, J. V.	Columbus
Oleinik, J. M.	Red Lodge
Powers, J. C.	Billings
Rathman, O. C.	Billings
Richards, W. G.	Billings
Russell, L. G.	Billings
Shaw, J. A.	Billings
Smalley, R. E.	Billings
★Smith, W. P.	Columbus
Soltero, H. R.	Billings
Soltero, J. R.	Billings
Stripp, A. E.	Billings
Unsell, D. H.	Billings
Vye, T. R.	Laurel
Weedman, W. F. (Retired)	Billings
Werner, S. L.	Billings
Wernham, J. I.	Billings

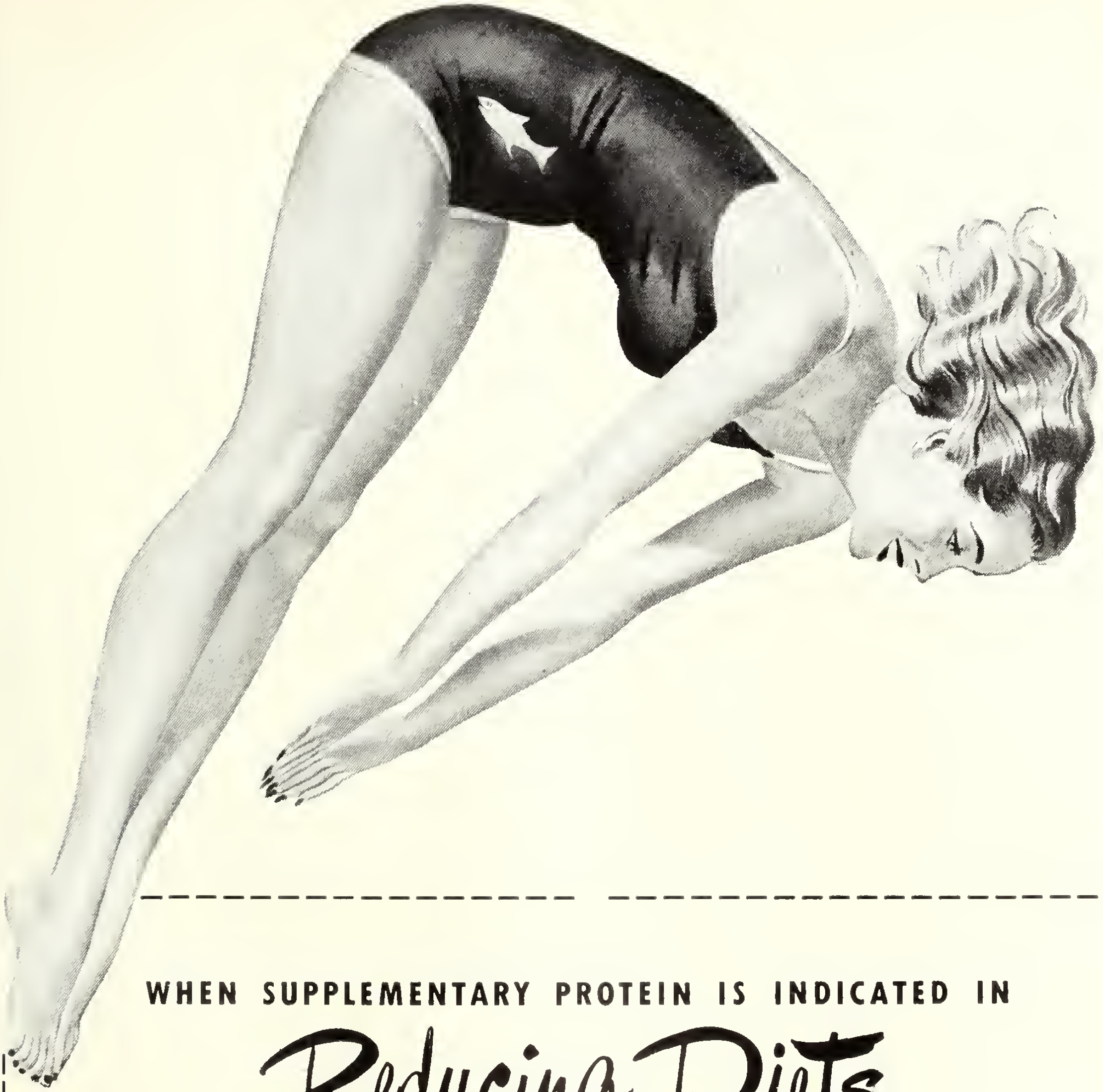
★Discharged from the Armed Forces in 1947.

Alphabetical Roster . . . 1947

Montana State Medical Association

Adams, E. M.	Red Lodge
Adams, Ellis W.	Great Falls
Agneberg, N. O.	Glasgow
Alderson, L. R.	Missoula
Alexander, J. L. (Life member)	Winnett
Allard, L. Clayton	Billings
Allard, Louis W.	Billings
Allred, Ivan A.	Great Falls
Almas, D. J.	Chinook
Anderson, C. E.	Great Falls
Anderson, Evon L.	Fort Benton
Anderson, M. O.	Hardin
Atkins, D. A.	Butte
Attix, Fred F.	Lewistown
Aubin, Francis W.	Havre
Babcock, D. W.	Missoula
Bangeman, John O.	Missoula
Barrow, Leonard A.	Billings
Baskett, L. W.	Big Timber
Bateman, H. W.	Choteau
Bayles, R. G.	Townsend
Beagle, J. S.	Sidney
Beal, Robert L.	Red Lodge
Beasley, W. A.	Galen
Bell, Robert F.	Dillon
Beltzer, Chas. E.	Washoe
Benjamin, L. M.	Deer Lodge
Benke, R. A.	Kalispell
Bennett, A. A.	Roundup
Benson, O. G.	Plentywood
Benson, R. D.	Sidney
Benson, R. E.	Billings
Benson, Theo. J.	Fromberg
Berg, David T.	Helena
Biehn, Ralph H.	Billings
Blackstone, A. V.	Absarokee
Blakemore, W. H. (Life member)	Baker
Blegen, H. M., Jr.	Missoula
Bole, W. S. (Life member)	Bozeman
Bourdeau, C. L.	Missoula
Boyer, Esther L.	Missoula
Bradbury, Jas. T. (Honorary member)	Willow Creek
Brancamp, Joseph H.	Butte
Brassett, Albert J.	Kalispell
Bresee, C. J.	Great Falls
Brewer, A. D.	Bozeman
Brewer, L. W.	Missoula
Bridenbaugh, J. H.	Billings
Bridenbaugh, R. B.	Bridger
Bridenbaugh, R. N.	Bridger
Bridenstine, I. J.	Missoula
Brogan, H. E.	Miles City
Brogan, R. E.	Billings
Brooke, C. P.	St. Ignatius
Brooke, J. M.	Ronan
Bulger, James J.	Great Falls
Burns, M. O.	Kalispell
Burns, W. J.	Twin Bridges
Burton, F. H.	Butte

Cairns, J. M.	Libby
Calvert, M. W.	Laurel
Campbell, R. M.	Helena
Cannon, P. S.	Conrad
Canty, Chas. R.	Butte
Caraway, H. T.	Billings
Carey, Walter R.	Rosebud, S. Dak.
Carmichael, Glenn A.	Missoula
Casebeer, H. L.	Butte
Casebeer, R. L.	Butte
Cashmore, W. F.	Helena
Chapple, R. R.	Billings
Claiborn, D. R.	Big Timber
Clark, C. A.	Eureka
Cockrell, E. P.	Kalispell
Cockrell, T. L.	Hinsdale
Cogswell, W. F. (Life member)	Helena
Colman, J. K.	Butte
Conway, W. Q.	Kalispell
Cooney, S. A.	Helena
Cooney, T. W.	Helena
Cooper, D. J. (Life member)	Hillsboro, Ore.
Copsey, Harvey	Missoula
Courtney, Donald L.	Helena
Craft, Chas. B.	Bozeman
Crago, F. H.	Great Falls
Crary, L. S.	Fairfield
Crouse, S. A.	Roundup
Danskin, M. G.	Glendive
Davis, Melvin R.	Harlem
Davis, R. C.	Great Falls
DeCanio, John	Sisseton, S. Dak.
DeMers, J. J.	Huntley
Dimon, John M.	Polson
Dion, Robert H.	Lewistown
Dodge, A. A.	Kalispell
Dolan, E. A.	Anaconda
Donich, G. M.	Anaconda
Doyle, W. J.	Superior
Drew, H. O.	Billings
DuBois, W. L.	Conrad
Duchesneau, F. P.	Butte
Dunkle, Frank	Absarokee
Dunlap, L. G.	Anaconda
Durnin, R. B.	Great Falls
Dyer, R. H.	Sheridan
Eck, Raymond L.	Lewistown
Eiriksson, C. E.	Bozeman
Elliott, L. L.	Cut Bank
Eneboe, Paul L.	Bozeman
Enochs, R. J.	Galen
Epler, D. C.	Bozeman
Farabaugh, C. L.	Missoula
Farnsworth, R. B.	Chicago, Ill.
Farr, E. M.	Billings
Farrand, B. C.	Jordan
Ferree, Virgil D.	Kalispell
Flinn, J. M.	Helena
Forster, W. L.	Havre
Foss, A. R.	Missoula
Fouts, E. R.	Ryegate
Fredrickson, C. H.	Missoula
Freed, Hazel	Stanford
French, E. J. (Life member)	Edmonton, Alta.
Frisbee, J. B.	Butte
Fuller, H. W.	Great Falls
Gallivan, Edw. L.	Helena
Gans, E. M.	Harlowton
Gans, Paul J.	Lewistown
Garberson, J. H.	Miles City
Garvey, J. E.	Butte
George, E. K.	Missoula
Gerdes, Maude M.	Billings
Gibson, H. V.	Great Falls
Gillespie, D. L.	Butte
Gleason, A. L.	Great Falls
Gold, M. A.	Butte
Gordon, D. A.	Hamilton
Gordon, Wayne	Billings
Graham, J. H.	Berkeley, Calif.
Greaves, J. P.	Great Falls
Gregg, Harold W.	Butte
Griffin, P. E.	Billings
Griffis, L. G.	Kalispell
Grigg, E. Ray	Bozeman
Guilfoyle, E. J.	Missoula
Hagen, Walter H.	Billings
Hagmann, E. A.	Billings
Halls, Cecil M.	Great Falls
Hall, E. C.	Laurel
Hall, E. L.	Great Falls
Hall, H. J.	Missoula
Hamilton, W. F.	Havre
Hammer, C. W.	Bozeman
Hammerel, A. L.	Billings
Hammerel, J. J.	Billings
Hanley, John C.	Great Falls
Harlowe, H. D.	Miles City
Harper, R. D.	Sidney
Harris, W. E.	Missoula
Harris, W. E.	Livingston
Hawkins, Thos. L.	Helena
Hayward, Herbert	Hamilton
Haywood, Guy T.	Forsyth
Heetderks, B. J.	Bozeman
Herring, J. H.	Lewistown
Hildebrand, E.	Great Falls
Hill, R. J.	Whitehall
Hitchcock, E. D.	Great Falls
Hodges, D. Ernest	Billings
Hodgson, E. R.	Great Falls
Hogeboom, C. F.	Baker
Holmes, Gladys V.	Warm Springs
Holmes, J. T. (Life member)	Missoula
Holzberger, R. J.	Great Falls
Honeycutt, C. F.	Missoula
Hoon, A. S.	Chinook
Horst, C. H.	Butte
Houtz, Chas. S.	Havre
Howard, Elna M.	Miles City
Howard, L. L.	Great Falls
Huene, H. J. (Life member)	Forsyth
Huggins, H. D.	Kalispell
Hurd, F. D.	Great Falls
Hurly, J. T.	Glasgow
Hyde, R. A.	Sidney
Hynes, John E.	Billings
Irwin, C. E.	Billings
Irwin, James H.	Great Falls
James, H. H.	Butte
Jestrab, G. A.	Havre
Johnson, A. C.	Great Falls
Johnson, M. E. K.	Chester
Johnson, R. G.	Harlowton
Kane, Jos. J.	Butte
Kane, P. E.	Butte
Kane, R. C.	Butte
Kargacin, Tom J.	Anaconda
Karsted, A.	Butte
Kearns, E. J.	Bozeman
Keenan, F. E.	Great Falls
Keenan, M. E.	Great Falls
Keenan, Thos. M.	Great Falls
Keeton, R. G.	Bozeman
Kev, Roy W.	Missoula
Kilbourne. B. K.	Helena
King, F. Ervin	Missoula
Kintner, A. R.	Missoula
Klein, Otto G.	Helena
Knapp, Robt. D.	Wolf Point
Knierim, F. M.	Glasgow
Kroeze, R.	Butte
Krogstad, L. T.	Wolf Point
Kronmiller, E. V.	Billings
Kronmiller, L. H.	Billings
Kuffel, Leonard	Missoula
Labbitt, L. H.	Hardin
Lacey, Wm. A.	Havre
Lapierre, J. Chas.	Butte
Larson, E. M.	Livingston
Larson, E. M.	Great Falls
Larson, K. D.	Billings
Larson, Roger A.	Billings
Lawson, Chester W.	Havre
Layne, J. A.	Great Falls
★Leeds, Robert	Chinook
Lees, A. T.	Whitefish
Leitch, Neil	Kalispell
Levitt, Louis	Boulder
Lewis, G. A.	Roundup
Lewis, R. O.	Roundup
Lhotka, J. F.	Butte
Lindeberg, Sadie B.	Miles City
Lindstrom, E. H.	Helena
Little, A. R.	Helena
Little, Chas. F.	Great Falls
Logan, James O.	Sunburst
Logan, P. E.	Great Falls
Long, W. E.	Anaconda
Lord, B. E.	Great Falls
Low, John E. (retired)	Sidney
Lowe, Fred H.	Missoula
Lueck, A. M.	Livingston
Lyons, C. R.	Drummond
MacBurney, L. R.	Great Falls
MacDonald, D. J.	Billings
MacGregor, J. C.	Great Falls
MacKenzie, D. S.	Havre
MacKenzie, D. S., Jr.	Havre
MacPherson, G. T.	Butte
Magner, Chas. E.	Great Falls
Maillet, L. L.	Great Falls
Malee, J. J.	Anaconda
March, J. A.	Livingston
Marks, Frederic S.	Billings
Marks, John E.	Whitefish
Marshall, Wm. J.	Missoula
Martin, Mary E.	Billings
Matthews, Vida J.	Butte
McCabe, James	Helena
McCannel, W. A.	Chinook
McCarty, J. C.	Forsyth
McDede, J. S.	Fort Benton
McElwee, Wm. R.	Townsend
McGill, Caroline	Butte
McGregor, H. J.	Great Falls
McGregor, J. F.	Great Falls
McGregor, R. J.	Great Falls
McIntyre, H. E.	Billings
McMahon, E. S.	Butte
McPhail, F. L.	Great Falls
McPhail, Malcolm	Great Falls
McPhail, W. N.	Missoula
Means, Robert R.	Red Lodge
Mears, Claude M.	Helena
Meis, Armon M.	Hamilton
Moffett, George J.	Deer Lodge
Monahan, R. C.	Butte
Mondloch, J. L.	Butte
Monserrate, D. N.	Helena
Moore, O. M.	Helena
Moore, T. B., Jr.	Kalispell
Morgan, Robt. M.	Helena
Morledge, Roy V.	Billings
Morris, Robt. W.	Helena
Morrison, Jas. D.	Billings
Morrison, W. F.	Missoula
Morrison, W. R. (retired)	Billings
Mortensbak, H. E.	Great Falls



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Nash, F. P.	Townsend
Nelson, C. H.	Billings
Nelson, J. M.	Missoula
Neraal, Paul O.	Cut Bank
Neville, J. V.	Columbus
Nesbitt, L. R.	Philipsburg
Noonan, E. F.	Wibaux
Odgers, Stephen L.	Butte
O'Keefe, N. J.	Butte
Oleinik, John M.	Red Lodge
Olsen, N. A.	Cut Bank
Olson, S. A.	Glendive
O'Neill, R. T.	Roundup
O'Rourke, J. L.	Anaconda
Packard, L. R.	Whitehall
Pampel, B. L.	Warm Springs
Paterson, W. F.	Conrad
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Pease, F. D. (Life member)	Missoula
Pemberton, C. W.	Butte
Peterson, R. F.	Butte
Peterson, R. L.	Hamilton
Place, B. A.	Warm Springs
Poindexter, F. M.	Dillon
Polk, R. W.	Miles City
Porter, E. S. (Life member)	Lewistown
Power, H. W.	Conrad
Powers, J. C.	Billings
Pratt, S. C.	Miles City
Preston, S. N.	Missoula
Pronin, Arthur	Plentywood
Randall, R. R.	Miles City
Rapp, Val Welton	Harlem
Rathman, Omer C.	Billings
Rew, A. W. (Life member)	Thompson Falls
Richards, W. G.	Billings
Richardson, R. B.	Great Falls
Ritchey, J. P.	Missoula
Robbins, B. L.	Glendive
Robinson, W. C.	Shelby
Rosdahl, C. E.	Missoula
Ross, F. B.	Kalispell
Rossiter, H. D.	Sheridan
Routledge, Geo. L.	Dillon
Rowen, E. H.	Miles City
Russell, Leland G.	Billings
Russell, Rosannah (Honorary member)	Fort Shaw
Ryde, R. E.	Glasgow
Saam, T. W.	Butte
Sabo, F. I.	Bozeman
Sale, Geo. G.	Missoula
Sandmeyer, J. A.	Great Falls
Sandy, B. B.	Ekalaka
Schemm, F. R.	Great Falls
Scherer, R. G.	Bozeman
Schubert, J. W.	Lewistown
Schwartz, Harold	Butte
Seerley, C. C.	Bozeman
Seidensticker, J. C.	Twin Bridges
Seitz, R. E.	Bozeman
Setzer, Geo. W.	Malta
Sexton, G. A.	Great Falls
Shaw, John A.	Billings
Shields, J. C.	Butte
Shillington, M. A.	Glendive
Sievers, A. R.	Butte
Sigler, R. R. (Life member)	Bozeman
Simons, John B.	Whitefish
Smalley, R. E.	Billings
Smith, A. N.	Glasgow
Smith, C. S.	Bozeman
Smith, P. A.	Glasgow
★Smith, W. P.	Columbus
Soltero, H. R.	Billings
Soltero, J. R.	Billings
Spicher, R. W.	Terry
Spurck, P. T.	Butte
Stanchfield, H.	Dillon
Stephan, W. H.	Dillon
Stewart, Robt. M.	Whitefish
Strain, Earle	Great Falls
Stripp, A. E.	Billings
Svore, C. R.	Missoula
Tanglin, W. G.	Polson
Tarbox, Byron R.	Forsyth
Taylor, W. W.	Whitefish
Templeton, C. V.	Great Falls
Terrill, Frank I.	Galen
Tefft, C. C.	Hamilton
Thompson, James R.	Miles City
Thompson, F. M.	Columbia City, Ind.
Thornton, C. R.	Missoula
Towne, R. L.	Kalispell
Townsend, G. A.	Emigrant
Trenouth, S. M.	Missoula
Trobough, G. E.	Anaconda
Turman, George F.	Missoula
Tyler, K. A.	Galen
Ungherini, V. O.	Butte
Unmack, Frank L.	Deer Lodge
Unsell, David H.	Billings
Vadheim, A. L., Jr.	Bozeman
Van Veen, F. L.	Ennis
Vennemann, F. W.	Ronan
Vye, T. R.	Laurel
Walker, Dora	Great Falls
Walker, R. E.	Livingston
Walker, T. F.	Great Falls
Waller, Geo. D.	Cut Bank
Waniata, F. K.	Great Falls
Weber, R. D.	Missoula
Weed, V. A.	Kalispell
Weedman, W. F. (retired)	Billings
Weeks, S. A.	Baker
Weisgerber, A. L.	Great Falls
Welden, E. A.	Lewistown
Werner, Samuel L.	Billings
Wernham, James I.	Billings
Whetstone, S. D.	Cut Bank
Whitehead, C. E.	Bozeman
Wilking, S. V.	Butte
Williams, R. A.	Bozeman
Williams, W. T.	Malta
★Willis, Park, Jr.	Hamilton
Winter, M. D.	Miles City
Wolgamot, John C.	Great Falls
Wright, G. B.	Kalispell
Yeatts, R. O.	Bozeman
Yuhas, J. L.	Missoula

★Discharged from Armed Forces in 1947.

. . . MEET OUR CONTRIBUTORS . . .

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Book Reviews

Clinical Psychology, by C. M. LOUTITT; revised edition. New York and London: Harper & Brothers, Publishers, 1947. Pp. 661. $4.00.

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With the end of the war, more and more interest is being shown in the development of our children. Crowded homes and congested schools have not interfered much with the physical growth of the child but in many instances have led to behavior problems. This book, therefore, deals with a timely subject, namely, the clinical psychology of children's behavior problems, which must be of interest to the general practitioner, the pediatrician, and the special investigator.

The material is presented in 15 well written chapters grouped into 4 sections, and there are 79 tables and 15 figures, all of which are very helpful in emphasizing facts stated in the text. At the end of each chapter, there is an up-to-date list of references which is of great assistance to those who wish to go a little more deeply into the subject of the mental development of the child. The monograph is a valuable addition to any physician's library.

A. V. S.

The JOURNAL LANCET

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Glaucoma, Its Mechanism

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Minot, North Dakota

No affection of the eye has a more romantic background than has glaucoma. Many great names are associated with it: Hippocrates, Leber, Duke-Elder, Fiedenwald, Gradle and Kronfeld. Yet much remains for investigation for we do not know what causes some forms of it, why it occurs when it does and what makes it appear in different forms. On the other hand, we do know a great deal, or at least have surmised a great deal about it. A review of what we know and think about it might help us to understand and even to treat some of our more difficult cases.

DEFINITION

The disease has been defined variously but to me it seems best to say it is an affection of the eye characterized by an increase in intra-ocular tension with accompanying visual loss from damage to the nerve elements.

INTRA-OCULAR TENSION

The normal intra-ocular tension varies within certain limits, with an arbitrary upper limit of 30 Schiötz. It is fairly constant in each person, although variations of considerable degree occur constantly in the same person even during the same day. This is considered a reflection of the changes effected by general bodily changes, including blood pressure variations, emotional states of the patient, and so forth.

The constancy of the normal tension is attributed to the finely adjusted neurologic control mechanism, probably situated locally in the ciliary ganglion and its network of branches. What determines this regulation has not been fully explained but its manner of action has been. Undoubtedly, the rate of entrance of the aqueous and its rate of outflow are pitted against the incompressible intra-ocular contents and the indistensible outer coverings.

Rather than discuss the anatomy of the eyeball, I shall only call attention to the fact that almost each item is concerned with the maintenance of normal pressure and has been the subject of some theory concerning pathologic increases in this pressure and its effects. I shall, therefore, only emphasize the peculiarities of any part I may discuss as it becomes pertinent to the problem at hand.

THE CHAMBER ANGLE

The anterior chamber angle has held first place in the attention of experimenters and clinicians for the longest time. It seems the most obvious site for aqueous outflow and its structure lends itself easily to a plausible explanation of the fate of the aqueous and its disturbances. Here the ciliary body meets the iris and the cornea, the canal of Schlemm and pectinate ligament. The ciliary body forms the aqueous and the pectinate ligament and canal of Schlemm carries it away. It is almost foolhardy to look any further for an explanation, but investigation invariably uncovers some influence of other parts of the eye and body to complicate matters. We may yet have to give some other part of the body the prime role in the mechanism of glaucoma etiology.

THE VASCULAR SYSTEM

The blood vessels and their contents control and evince some effect. This has been shown by the parallelism that exists between the intra-ocular pressure and that in the carotid. This has been demonstrated many times and is the basis of a test for the lability of intra-ocular tension proposed by Bloomfield and Lambert.[1] While a sustained rise in the general blood pressure is not reflected

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in a similarly sustained rise in intra-ocular tension, this undoubtedly is due to the operation of mechanisms of control regulating the latter. It therefore becomes quite obvious that except for some peculiar-acting substance which affects the local mechanism as well as the general body mechanism, such, for example, as is present in epidemic dropsy, general circulatory disturbances are not of great consequence in abnormalities of intra-ocular tension.

The local blood supply, however, is very important. It comes from the ciliary arteries and disturbances of it may greatly affect the supply of aqueous and eye tension. D. Guerry coagulated the long posterior ciliary arteries by diathermy.[2] When only one was destroyed, a lowered tension resulted which lasted for about two weeks. This occurred in both man and experimental animals. If, however, both were destroyed, phthisis bulbi resulted in about 50 per cent of the cases.

The Ciliary Body

There is fairly general agreement that the ciliary body has much to do with formation of the aqueous. It is a highly vascular structure and its processes are greatly folded on themselves like any gland might be. The latter formation has led to the conception that the aqueous is secreted by these processes like any other bodily secretion. Hamburger has supported this idea. The processes, however, are not true glands and Leber and his followers discarded this notion for one of filtration; the site of formation was still here but by simple filtration through the thin highly vascular membrane. Both of these individuals supposed a continual circulation of the aqueous to occur with a streaming through the angle where it was drained out into the general circulation by small venules leading to the anterior ciliary veins. If a dye such as fluorescin is injected into the general circulation it will appear in the eye in a short time; but always at the pupil first. Eventually it disappears, apparently through the canal of Schlemm as the venous part of the circulation. (Friedenwald and his associates have measured the pressure hydrostatically and found that it is lowest in the canal of Schlemm.)

Duke-Elder is not satisfied with either of the above theories as to the formation, or even with the notion of continuous circulation. He combines both of them to include the osmotic action of the aqueous contents as the mode of formation. He further feels that no actual circulation (continuous) occurs. Instead, he says a thermodynamic principle is involved. The anterior surface of the cornea is a great deal cooler than is the aqueous at the ciliary processes (by about 3 to 5 degrees.) This is what causes convection currents of the aqueous towards the cornea. The canal of Schlemm and the pectinate ligament acts only as a safety valve to open and let the fluid out when the pressure rises, and to close and keep it in when the pressure is low. The inflow and outflow of the aqueous is an intermittent affair. Thus it can be seen that all theories are agreed that anything which interferes with the accessibility of the canal and its connections with the general circulation may cause a rise in tension.

The ciliary body is situated at a point where increase in its size might push the iris forward against the posterior corneal surface and interfere with aqueous circulation. Hyperopic eyes have markedly developed ciliary muscles and should be inclined to become glaucomatous eyes; and this is so. Similarly the swollen ciliary body of cyclitis should predispose and it does—though there are other factors more important, as we shall see later.

The Iris

Similarly, the iris may be an important contributor in raising intra-ocular tension. It lies close to the posterior surface of the cornea and when dilated it becomes bunched up into a roll projecting forward and easily plastered against the cornea to prevent the normal function of the canal of Schlemm. If the chamber happens to be a very shallow one it should do this the more readily. Now by means of gonioscopy it is possible to study the angle and see how wide or how narrow it is. This has become the basis for classification of glaucomas into narrow and wide angle glaucoma. The wide angle glaucoma does not have the problem of an adherent or bunched-up iris and is obviously not helped by the miotic action of the antiglaucomatous drugs. The narrow angle glaucoma should be greatly helped.

The function of the iris in the destiny of the aqueous is not completely settled. Because of its vascularity it should be a factor in the production of the aqueous, although almost all experimenters feel it has a secondary role. Perhaps it has something to do with the outflow for when Friedenwald measured the rate at which the anterior chamber could care for saline injected into the anterior chamber he found it greatly increased when the iris was vasocongested. It sheds pigment even when not inflamed, and this may be an important contributing factor in blocking the anterior chamber angle. Barkan believes this to be true.

The Canal of Schlemm and the Pectinate Ligament

This should logically be the point of concentration of most of our investigators. But it has not produced much that is absolutely conclusive. The canal is so tiny that while anatomic examinations have been made often, the functional physiology is very difficult of approach.

Normally, no formed elements such as red cells are found here. This has been attributed to the presence of valves or, as more recently surmised, to the presence of minute afferent arterioles whose constriction normally prevents red cells from entering. The contents have been shown by Friedenwald to have a higher protein content which he thinks exerts an osmotic force towards the canal. He has also measured the hydrostatic pressure of the canal and found it very much lowered.

In pathologic eyes, sclerosis of the canal and pectinate ligament has been found by Verhoeff. He thinks it is an accompaniment of increasing age and assumes that this may be a predisposing factor in the interference with the normal outflow of the aqueous. This seems logical. Further, many abnormal materials have been found in the region clogging the openings. Capsule epithelium, uveal pigment and, of course, the fibrinous deposits as well as the formed elements of inflammatory affections of the eye are obvious causes of obstruction, though it must not be forgotten that many forms of debris are a normal accompaniment of old age and, therefore, are thought by many to be the evidence of sclerotic changes of age rather than of glaucoma. There must be something else, for Casnovas was able to produce a rise of intra-ocular tension in animals with fluid from glaucomatous eyes injected into their general circulation. As yet, no one has been able to isolate this, but here may be the unknown factor that causes glaucoma in one eye and not in another with similar anatomy.

The Lens

The lens could be a possible cause for glaucoma if the increase in its size should occur quickly enough to crowd the contents of the anterior chamber forward. This we have all seen in the rapidly developing traumatic cataract with increased intra-ocular tension, although there are some who attribute the rise in tension to the irritant toxic action of the changing lens contents. Glaucoma capsulare, of course, is a secondary type of glaucoma but it may be that it points the way to some of the causes of our primary cases. (Incidentally, the obverse, the development of cataract in glaucoma is a very interesting problem.)

The Vitreous Body

The vitreous body was long considered a possible site of the pathology of primary glaucoma. It could very uniquely explain all the findings, but, unfortunately, no swelling has ever been demonstrated even now with ultramicroscopic methods.

The Choroid

The rich vascular bed of the choroid forms an interesting possible explanation as the cause for increased tension. Its swelling could push all the contents of the posterior part of the eye forward to plaster the iris against the posterior corneal surface. Gradle insists this is the mechanism for many glaucomas; but what causes it to swell has not been discovered except for the production of irritating substances such as occur in epidemic dropsy or occlusion of the central vein of the retina. It is interesting to note that stimulation of the cervical sympathetic produces a drop in the pressure while a rise occurs when amyl nitrate is used (the so-called adrenalin effect). Undoubtedly, this is the result of action on the vascular bed of the eye. Clinical proof of the effect of the sympathetic is further found in the lowering produced by retrobulbar injections.

Orbital and Lid Muscles

These muscles, especially the orbicularis oculi, are also important in the maintenance of the intra-ocular pressure and are thought by some to promote the circulation of the aqueous. Squeezing is supposed to be the means of action of the orbicularis, while the external ocular muscles massage the eyeball by their contraction. One may notice this in forced convergence. Müller's muscle has been singled out as causing changes in pressure, especially in experimental animals. Stimulation of the cervical sympathetic causes it to act even if the carotid on that side is ligated.

Light

Light was supposed to cause a fall in pressure by its miotic action on the iris, but this action has been disproved and the only action accepted as causing a fall such as is seen is the dilatation of the capillaries. This is the only way to explain its action even in aniridia or after iridectomy.

Chemical Action of Drugs

Atropine and its class of drugs causes a rise in pressure by its dilatation of the iris, the mechanism being similar to that observed before in our discussion of obstruction of the angle.

Miotics act in several ways. They act on the vascular system, producing a dilation of the vessels. In the normal eye a slight rise in tension occurs; but in the glaucomatous eye with its venostasis this dilation helps to get rid of the excess blood and improves the circulation. The miotic action is dependent upon parasympathetic stimulation. This is due to the liberation of acetylcholin which acts at the myo-neural junction. Cholinesterases are formed immediately to counteract this action. Eserin and prostigmin inhibit this esterase action and permit the normal acetylcholine to continue its action. Pilocarpine and histamine do not destroy these esterases but act directly on the muscles. The newer choline derivatives supplement the normal choline action. The miotic action pulls the iris away from the anterior chamber angle, increases the absorptive surface of the iris, compresses the anterior ciliary artery and pulls on the scleral spur to open up the canal of Schlemm.

Adrenalin causes an initial fall due to vasoconstriction followed by a rise due to general blood pressure rise and a reactive fall due to capillary dilation. This is beneficial in chronic simple glaucoma but may prove very dangerous in chronic congestive or acute glaucoma. This may be due to pupillary dilation and, therefore, suggests the use of eserine before and after adrenalin treatment.

Compensation

The eye adjusts itself to increases in tension if they are insidious and of long duration. No external evidence of the abnormality is apparent because the adjustment is so gradual. The cornea stays clear, the episcleral vessels are not dilated and, except for optic nerve changes, nothing is visible to the examiner. This adjustment or compensation on the part of the eye to this abnormally high intra-ocular pressure represents a phase wherein the factors for outflow have presumably balanced those causing increased tension. It is now common practice, therefore, to speak of compensated glaucoma instead of glaucoma simplex. Apparently when the pressure rises it compresses the vascular system, the veins first, which shuts off the outflow of blood *temporarily* for as the pressure in the arterioles rises, it again forces the veins open. Instead of the gradual adjustment—the eye may not be able to handle the situation—violent evidence of the intra-ocular increased pressure becomes manifest. The anteriorciliary and deep limbal veins become dilated, the cornea becomes edematous, the pupil is widely dilated and pressure on the branches of the fifth nerve causes pain to appear. This is congestive, inflammatory, or decompensated glaucoma. These eyes are nearly always shallow-chambered.

DISCUSSION

It is obvious that the mechanism for control of the intra-ocular tension and its derangements is a complex problem with many facets. Those ideas that would account for all the derangements have not been proven, and those that have been found factual are inadequate for all our cases. The most certain thing is that primary glaucoma is becoming less and less inclusive in the true sense of no apparent etiology because as the real causes become known the primary cases become relegated to the secondary group. This is, of course, the story of many other diseases of the body.

Much of what we do for the glaucoma remains empiric in nature. Perhaps when the true causes appear the rationale for these procedures will become apparent and we will apply them more intelligently. Until then it would be good for us to examine what we know and apply it to the cases at hand.

Gonioscopy is so simple a procedure that it should be part of the examination of each case. We need not necessarily use it only when goniotomy is indicated; for it may tell us if our miotics are of value, if an iridectomy will fail, why hemorrhage will follow some procedures and nullify our efforts, and a great many other things we should know.

Similarly, retrobulbar injection to control tension and pain in acute incompensated cases is worthwhile. Icaza[3] of Mexico tells of having maintained tension at a low level and controlled symptoms in these patients for periods long enough to make operation a more leisurely and less hazardous affair. I think this is an attack on the problem that is near to the basic cause for glaucoma disturbances. Leo Hess may be right when he insists the pathogenesis is an interference with the nervous mechanism of control caused by a disturbance of the reflex arcs involved.

Cyclodiathermy of Vogt and other procedures aimed at the control of the vascular supply to the ciliary body look as if they may find great usefulness. In cases of intractable pain and those with a tendency to bleed, such as diabetics, Meyer and his associates have had very promising results.

Intelligent use of drugs will help control many cases before surgery and make up for the deficiencies of surgery afterward. Glaucoma needs study and some day we will all acquire the knack of recognizing the "pre-glaucoma" that Gradle talks about. It should prevent a lot of lost vision that now occurs before the patient comes to us. It is a sight-saving program worth our efforts.

I find Duke-Elder's discussion of the causes of glaucoma interesting. He takes up the predisposing factors of refraction, mydriasis, blood, capillary system, systemic diseases, neurovegetative system and endocrine glands. He says, "In summary, therefore, while it must be admitted that many of these observations are scanty and somewhat perfunctory, it may be said in general terms that *primary glaucoma tends to occur in persons over middle age who have some vascular disability, either of sclerosis or dysfunction:* the first group is essentially of a degenerative type; the second is one of which medical science has yet scanty knowledge, but it is *characterized essentially by vasomotor and endothelial instability and bound up with imbalance in the neurovegetative and endocrine systems.*"

It is a definition that includes all the eye and the body—and that is what glaucoma most likely is. The enigma will not be solved until we know more about how the two are related normally and what parts of the relationship are disturbed in disease.

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STUDY OF AMERICAN BLOOD PROGRAM

Scholarships for the study of blood and its derivatives have been offered to a selected group of professional candidates from foreign countries by the American Red Cross in cooperation with the League of Red Cross Societies. These candidates will be proposed by the national Red Cross societies and will be selected on a basis of personal and professional qualifications, as well as on the need in their country for information on the use of blood fractions. The scholarships will be for 9 to 12 months of study in the United States and will have a value of $2,500 to $3,000.

The training will include study of methods of collecting and processing blood, processing plasma to the products of plasma fractionation, and the uses of blood and blood derivatives in medicine and public health. Methods of recruiting donors and plans for organization will also be studied. Field work will be done in such varied parts of the country as North Dakota for mobile fields laboratory operation, Michigan for its state plan of plasma fractionation, and in Miami, Florida, for private blood bank maintenance.

Details of the training were worked out by Dr. Warren F. Draper, assistant administrator, Medical Services, American National Red Cross, in cooperation with Dr. Charles A. Janeway of Boston, chairman of the Red Cross Advisory Committee on Blood and Blood Derivatives.—*The Military Surgeon*, July, 1947.

Polycystic Kidney Disease

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Little is known of the exact mode of formation of congenital polycystic kidneys. They have been reported in all age groups, are present in infants on occasions and have been described in autopsies on the fetus. We realize now that the reason why most cases are first seen in adults is not because they occur at this time of life but because the symptoms of the disease and the associated renal insufficiency make their appearance at this time. The literature abounds with reports of cases that are entirely symptomless and in which the condition is found accidentally at operation, postmortem, or during an examination for some entirely remote condition.

The following case is presented, that of a patient who had symptoms of the disease prior to undergoing surgery: Mr. T. S., age 24, entered St. Luke's Hospital on the medical service of Dr. N. F. Fisher on October 22, 1945. He gave a history of having had frequent attacks of severe pain in the left lateral subcostal region in the past two and a half years. This pain was a dull, steady ache, but intense enough to require codeine for relief. This pain recurred sometimes in the right subcostal region, other times it was bilateral, but was persistently severe on the left side. Such attacks had lasted from one to nine days in the past. The attack which hospitalized him on October 22 was bilateral, began five days before admission to the hospital, and had been the most severe one he had. One urination before admission was brownish but he had never seen frank blood in the urine.

Family History. Father died at 49 of angina pectoris. Mother 53 years old and is well. One brother, living and well. The patient stated that his whole family was subject to high blood pressure.

Physical Examination. The patient was considerably overweight. The blood pressure was 220/134 and pulse rate 96 with occasional extra systoles. The heart was slightly enlarged to the left. No masses could be felt in the abdomen, liver, kidneys, and spleen could not be made out, but there was tenderness in the left costovertebral angle.

Laboratory on Admission. Blood count was normal. Blood chemical evaluation showed a nonprotein nitrogen of 73 and a creatinine of 3.6.

No urine was obtained for urinalysis. No urine was passed on his second day in the hospital in spite of a normal fluid intake. On the third day 3000 cc. of 5 per cent glucose solution were given intravenously in addition to the fluids taken by mouth. A catheter was passed into the bladder and *no* urine obtained. At this point we were asked to see the patient. His skin was red and there was profuse perspiration though his temperature was only 99° rectally. He was drowsy and complained of pain in both kidney regions but chiefly on the left. A flat X-ray plate of the abdomen showed no stone shadows, but gave the impression of a considerably enlarged left kidney. At this time the nonprotein nitrogen had risen to 137. He was taken to the cystoscopy room at once and on passing the instrument no urine was obtained. The bladder and both ureteral orifices appeared normal. Number 6 ureteral catheters were passed to both kidneys without difficulty. There was an immediate, steady drip of clear urine from both catheters. The catheters were left in place and the patient returned to bed. In the first hour of the catheter drainage there was just over a liter of urine output and 3500 cc. in 18 hours. Good urine output continued.

Two days later a left pyelogram was made. The right side was not done for safety's sake. Three days after the ureteral catheters had been inserted the nonprotein nitrogen had come down to 97 and on the next day the catheters were removed. Almost immediately the urine output diminished, and the patient began to run a temperature as high as 103°. After four days without the catheters it was necessary to reinsert them. Again the urine output became large and the temperature came down. This time the urine was not clear and cultures showed the infective organism to be *B. lactic aerogenes.* A right pyelogram was made.

Catheter drainage of the kidneys was continued for four days with marked improvement in the patient and reduction of the nonprotein nitrogen in the blood to 72 mg. and reduction of the fever. Again, after removal of the catheters, urine output became scanty and the patient had chills and fever, became toxic and drowsy and catheters had to be inserted for the third time. This time the urine from both kidneys was heavily infected although the daily output varied from 3000 to 5000 cc.

The patient continued to run a septic temperature in spite of sulfa drugs and penicillin. Several blood transfusions were required because of anemia. On this occasion the catheters were left in place for fourteen days and at the end of this time his nonprotein nitrogen had come down to 39.5 mg. He still ran a septic type of temperature. The urine output did not diminish after the removal of the catheters, but did remain turbid. Pain and tenderness in both kidney regions continued intermittently and about two weeks later a definite bulging could be seen in the left costovertebral region.

On December 12, six weeks after entering the hospital and eighteen days after removal of the catheters, both renal regions were surgically explored. On the right side we found a typical polycystic kidney with considerable edema of the perinephric tissues. On the left side there was a still larger polycystic kidney with a large perinephritic abscess, which was drained. Following this, there was rapid and steady improvement and the patient left the hospital on January 20, 1946, ninety days after admission and seven weeks after the drainage of the abscess. At this time he was afebrile. He still had a moderate anemia. His urine was faintly hazy with pus. The urea nitrogen in his blood was 13 mg. and the nonprotein nitrogen was 30.8 (both perfectly normal). He was back at work in April, felt well and had no further difficulty.

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Presented at the annual meeting, South Dakota State Medical Association, June 3, 1946.

DIAGNOSIS

The mode of formation of the cysts and the etiology of the disease are not explained entirely satisfactorily. Vrichow has advanced the idea that the cysts result from fetal inflammation of the lower urinary tubules in the region of the papillae. Hildebrandt advanced the theory that the cysts were the result of malunion between the convoluted and collecting tubules. These have separate embryological anlage; the glomeruli, convoluted tubules and loops of Henle arising from the metanephros, while the collecting tubules are the result of the upward growth of the Wolffian duct to form the ureter, pelvis, calyces and collecting ducts. Kampmeir explains the cystic formation as a result of degeneration in embryonic epithelial rests and therefore of neoplastic origin. An idea that tubular occlusion, plus local ischemia, causes this condition was advanced by Hepler. There are many objections to all these explanations; however, the associated cysts often found in the liver, ovary, uterus, bladder and epididymus are further evidence of the congenital origin of the disease.

The pronounced hereditary tendency in this disease is of interest and value to the clinician. In almost all of our cases such a history could be elicited. We have a number of families under our observation in which I personally have followed the disease through three generations and my associate, Dr. Louis E. Schmidt, has seen the disease in a still earlier generation in the same families. Low and Coakley state that the condition is so definitely congenital that sterilization has been recommended for children of parents with polycystic disease. This procedure might be considered a bit drastic but members of a family in which polycystic disease is present should be made acutely aware of the fact that their offspring are likely to inherit the condition.

Probably the best index of the progress of the disease is found in the laboratory. The dye function tests vary in degree from normal findings in those cases with sufficient functioning kidney tissue to that of a degree of impairment that would seem to be hardly conducive with the carrying on of life. We have injected phenolsulphonphthalein in cases with far advanced polycystic disease where only a faint trace of the dye could be recovered in a twenty-four hour specimen of urine. The same holds in attempts at getting intravenous pyelograms in advanced cases. The secretion of the dye, if any, is so small in amount that no change in contrast in kidney films can be noted.

In advanced cases, the blood chemistry becomes the most dependable means of determining the progress and variation of the disease. In patients with polycystic disease the nitrogen components of the blood can reach exceedingly high figures with the patient clinically in fair health. I remember very well a patient of ours, a judge of a high court, who worked for a number of years with a nonprotein nitrogen consistently over 140, and did a good job, too. His only symptoms were a mild tremor and shortness of breath on physical exertion. In very late cases, the blood chemistry findings are very high and shortly before death it is not uncommon to have the nonprotein nitrogen reach a figure of well over 300 mg./per cent and the creatinine go up to 14 or 15 mg./per cent. In medical school I was taught that a creatinine of 7.5 mg. was not compatible with life. Since then I have seen a number of cases with creatinine over 10 mg. without even the ordinary signs of early uremia. Apparently the rate of rise of the blood nitrogen components has much to do with how toxic they are. In polycystic disease where progression is exceedingly slow the body tissues become accustomed to the slow accumulation of these toxic products.

The blood pressure in polycystic disease usually does not reach the high levels seen in cases of interstitial nephritis. In our cases the average cystolic pressure is around 150 and only rarely have we seen cases with blood pressure of 180 or 200 such as in the case I have just reported.

Oppenheimer in an excellent review of this subject found an incidence of polycystic disease in one of 356 autopsies and in one of 3,500 hospital admissions. He states that the average age of onset of symptoms, in his series, was 41. The symptom which is most constant and the one which usually brings the patient under medical observation is hematuria. This bleeding may be transitory and be present for only a few urinations or it may be so severe as to practically cause death from loss of blood. It may be brought on by slight trauma or without known cause. In one of the cases under our observation there was, in the late stages of the disease, a persistently pink-brown color in the urine with not sufficient red cells present to account for it. This pigment was found to be hemoglobin and probably resulted from old, broken down blood which had been present in some of the cysts for a long time.

Pain is an almost constant symptom. This is usually of a dull, heavy nature and is present in the lumbar region. There may also be episodes of severe, colicky pain which occur during the course of acute infection or during a period of bleeding when a clot is passing down the ureter. The symptoms of uremia, such as headaches, vomiting, malaise and drowsiness, may be present especially after the blood chemistry has begun to rise considerably. In most cases one can feel an abdominal mass. The case I have presented was too obese for this, however. One must remember that the two kidneys do not enlarge at the same rate in many instances and only one kidney can be palpated. This fact confuses the issue and makes one think of kidney tumor or masses in the retroperitoneal space. A moderate hypertension is the rule—although in two of the cases with very large kidneys, who died of kidney insufficiency, the blood pressure never went above normal. In the urine one usually finds albumin, casts and red blood cells, and as the condition advances a persistent low specific gravity. The kidneys lose their concentrating power as shown by concentration and dilution tests. In early cases there may be no abnormal findings in the urine. The pyelogram is usually quite characterisitc although there are wide variations dependent on the size and position of the cysts. The calyces are markedly elongated although the cupping is fairly well retained. The pelvis is usually large and long without having the bulgy appearance of a hydronephrosis. The typical contour of the pelvis in polycystic disease has been dubbed "dragon deformity."

Retrograde pyelograms and ureteral catheterization should not be used if a diagnosis can be made without them and then only one side should be done at a time. Polycystic kidneys are easily thrown out of balance and are easily infected. We have no sympathy at all with the urologist who on the slightest provocation rushes in with the cystoscope without any attempt to reach a conclusion by other means.

Polycystic kidney disease is often complicated by other renal pathology, infection being the most common one. The same organisms which are usually found in renal infections can also produce infections in polycystic disease. Even tuberculosis of the kidney has been reported as a complication of polycystic disease. Calculus formation was present in only two of our cases, and they consisted of small concretions that failed to show up on the X-ray plates but were passed spontaneously. We also have seen one case in which a hypernephroma developed in a polycystic kidney. In the literature a fair number of neoplasm complicating this condition are reported.

The cause of death in most cases is due to uremia or vascular accident though many of them live and die with a diagnosis of nephritis and not until the autopsy is the whole story revealed.

TREATMENT

Treatment of this condition is easily divided into medical and surgical. Rovsing in 1926 advised an operation in which one or both kidneys are exposed, the large superficial cysts resected and punctured. This operation has been almost universally discarded because of its lack of value and its danger.

Decapsulation has been recommended but has been dropped as a rational procedure. In 1935 Goldstein devised an operation wherein the kidneys are kept exposed for a long time by suturing the kidney to the wound edges and leaving the wound open. Subsequent daily drainage of the cysts with a syringe and needle results in decreasing the size of the kidneys. The wound deformity is later allowed to fill in with scar tissue. I have had no personal experience with this procedure.

Nephrectomy for supposed unilateral polycystic disease is not to be reconciled with known pathological data. A removal of the more advanced side stimulates the development of cysts in the so-called well side. This is well illustrated in an autopsy specimen of an only remaining kidney weighing 5220 grams. The other kidney had been removed seven years before.

Surgery, in our opinion, on polycystic kidneys should be resorted to only as a life-saving measure. Nephrectomy in uncontrollable hemorrhage, in intractable unilateral infection, or for malignancy is justified. All other treatment should be directed toward conservation of kidney tissue and kidney function.

We ask our patients to eat a general mixed diet, being moderate in the amount of protein they eat and discouraging highly seasoned foods. Patients are instructed as regards bowels, occasional sweats and the avoidance of undue exposure to cold and wet and intercurrent disease. All manner of strenuous exercise and hard physical work is advised against. And we impress them with the necessity of regular and sufficient rest. Complications are treated as they arise. On such a schedule most of these people do very well and may live in comparatively good health for a long time. We have a women of 83 with tremendously enlarged kidneys under our observation at the present. She is more active than most women of her age, perfectly clear mentally, has a normal blood pressure, and only a slight increase in her blood chemistry. Not all patients are as fortunate as she is, however.

SUMMARY

Polycystic kidney disease is congenital and progressive. Death usually results from uremia or vascular accident. Surgery is indicated only for certain complications. The treatment of choice is directed toward conservation of kidney tissue and function.

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Dick Tests and Localized Reactions Following Intracutaneous Injections of an Erythrogenic Toxin in Student Nurses*

Ramona L. Todd, Ph.D., M.D.
Minneapolis, Minnesota

Because of the observed frequency of general reactions [1] following the subcutaneous administration of toxin for the immunization of student nurses against scarlet fever, it was decided that the method and material described by Veldee, et al [2] would be used. The method consists of the intracutaneous inoculation of an ammonium sulfate purified and tannic acid precipitated erythrogenic toxin first reported by Veldee [3] in 1937 and improved by the same author [4] in 1938.

A group of students in the School of Nursing at the University of Minnesota was selected for the observations. Dick tests, administered and read according to the principles set forth by Dick and Dick,[5] were applied at the time of the students' entrance to the School of Nursing. There were 112 persons who reacted to the test as evidenced by an area of erythema 10 mm. or more in diameter about the site of injection of 0.1 cc. of scarlet fever toxin. The tests were read 24 hours after application. Those individuals with positive tests were given a series of intracutaneous injections of toxin as outlined for adults by Veldee, et al [2] as follows: 500; 2,000; 6;000; and 10,000 skin test doses, respectively, with a two weeks interval between injections. The toxin is so prepared that each dose is contained in 0.1 cc. which is a convenient amount for intradermal use. One month after the fourth inoculation Dick tests were done. If the individual still reacted to the test, a fifth dose of 10,000 skin test doses of toxin was given and another Dick test applied one month later.

Localized reactions of swelling, redness and tenderness at the site of injection of the toxin were practically universal. This confirms the observations of Veldee [2] who states that "induration is always present and tenderness on palpation is usually present in some degree". Itching, local heat and the formation of a tiny vesicle at the site of the needle insertion were sometimes noted. At no time was the local reaction severe enough to necessitate either decreasing the dosage of toxin or interrupting the injections. Generalized reactions, such as fever, nausea, vomiting, diarrhea, or skin eruptions, did not occur in any of the 112 persons included in the present study.

The results of Dick tests applied one month after the fourth injection of toxin are summarized in the table. Of the 112, there were 42, or 37.5 per cent, who still reacted to the test. This is in rather sharp contrast to the 18.7 per cent of student nurses who reacted following subcutaneous inoculation of scarlet fever toxin in five weekly doses; however, it is significant that a total of 143,150 skin test doses were used as compared to 18,500 by the intracutaneous method. Veldee, et al [2] found that 19.7 per cent of 76 students nurses who were retested less than six months after intracutaneous inoculations still reacted to the Dick test.

Results of Dick Tests One Month After Completion of a Series of Four Intracutaneous Scarlet Fever Toxin Injections

Dick Test One Month After Fourth Injection		Number	Percent
Positive		42	37.5
Negative		70	62.5
	Total	112	100.0

The 42 persons, whose Dick tests were positive one month after four toxin inoculations, were given an additional injection of 10,000 skin test doses. One month later, 29 of these again had Dick tests, 25 of which were negative and 4 of which remained positive. There were 13 individuals who were not available for the final testing. Although the numbers are too small to permit generalization, it would seem that, for young adults, five inoculations using a total of 28,500 skin test doses of toxin would be preferable to four injections with a total of 18,500 skin test doses.

Of the 70 who did not react to the Dick test administered one month after four injections of toxin, 62 were retested from four to six months later. There were 44 who still did not react and 14, or 22.6 per cent, whose Dick tests had changed to a positive reaction. This finding is another indication that four inoculations are insufficient for a scarlet fever immunization procedure undertaken for a group of adults, if indeed such an undertaking is worthwhile. Resistance, as judged by the Dick tests, was often temporary in that the level of protection frequently dropped to a point where the skin test reaction was positive in less than six months.

Summary

1. Localized reactions of redness, swelling and tenderness at the site of intracutaneous inoculation of ammonium sulfate purified and tannic acid precipitated erythrogenic toxin occurred in all of 112 student nurses who received the injections. No severe reactions were noted, however. Generalized reactions did not occur.

2. There were 42, or 37.5 per cent, of the 112 women who still reacted to the Dick test one month after receiving the last of a series of four inoculations, or a total of 18,500 skin test doses.

3. After an additional dose of 10,000 skin test doses of toxin, 4 of 29 persons retested still reacted to the Dick test.

4. It was noted that 22.6 per cent of 62 individuals whose Dick tests had become negative after four injections had changed to positive reactions in four to six

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*From the Students' Health Service, University of Minnesota.

months.

5. The results of the present study would indicate that the intracutaneous injection of the purified and tannic acid precipitated erythrogenic toxin is not an entirely suitable material for immunization of adults against scarlet fever.

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Book Reviews

Mental Health in Colleges, by C. C. Fry and E. Rostov. Commonwealth Fund, 1942. 384 pages. $2.00.

* * *

This book, not a recent one, should certainly by now have become well established in its rightful niche. It becomes more interesting and valuable with the reanimation and expansion of interest in college mental hygiene as an aspect of preventive psychiatry such as is represented by the pioneering at Yale. The authors have done well in delineating the problem of mental health as it relates to college students. Their basis is an experience of approximately two decades and its illustration through 1257 cases of one decade.

Fifty-three per cent of their cases had a minimum of one and a maximum of three contacts with the psychiatrist. Probably, in the main, this represented a satisfactory treatment intensity and a relatively high frequency of fairly superficial problems responding to simple expedience. Msiinformation about sex, advice needed about marriage, advice needed about vocation, or information regarding mental disease are examples in this latter category. However, there were, in this 53 per cent, cases where discontinuance of therapy was the result of discretion by the psychiatrist—where deeper treatment was not warranted or contra indicated. Therapeutic efforts are also reflected as varying with the load and facilities through the years. These points are particularly illuminating with regard to the renewed interest in preventive psychiatry and psychotherapy at the college level: a subject of much recent literature and controversy. It deals with a field where adequate qualification and training are critical, for this is an age period and status where all of the dynamics of normal development and those of neurotic and abnormal development are in critical full play. Cases carried more intensively were of two general types: those which were problems of personal growth and development and, second: those concerned specifically with the individual's reaction to the particular environment of the university. There was a very minimal amount of work with more severely established mental illness. This may have been primarily the reflection of a low incidence and clinic policy, but it certainly does reflect consideration of a time period prior to the present, and probably transcient, college population of somewhat older chronological age.

The reader is impressed with the fact that in a private school such as Yale social life is structured and limited more by cultural factors (in a sociological sense) than in such an institution as a state university; and consequently, these pressured are greater than where social distinctions possibly mean less. One notes the absence of case work and problems of women students who present different aspects and intensities of personality factors.

The book affords an excellent demonstration of the harvest in adolescence of the seeds sown in heredity and environment. One would have appreciated more detailed case studies and methods of treatment. The students encountered form a cross section of the university population and attributes of personality and behavior to be found in any social group. The chapter dealing with family relationships pertaining to personality development and health is excellent. The extent to which sex problems present common conflicts is stressed, but not out of focus with other aspects of the personality. Cases are well selected to point out the various conflicts and behaviors with their underlying forces. A thesis or exposition appears throughout the text. It is that college students are adolescent and the college environment tends to maintain dependency and intensify or bring to focus the conflicts ensuing in moving to maturity, emancipation, and self responsibility and adequacy. Withall, it is well written and should serve as a primer and perhaps a road map not lightly to be disregarded in this work.

R. H.

Textbook of Gynecology, by Arthur H. Curtis, M.D., 5th edition. Philadelphia: W. B. Saunders Co., 755 pages, over 600 illustrations. $8.00.

* * *

Considerable revision and rewriting as well as new illustrations are evident in the fifth edition of this textbook on gynecology. The section on endocrines consisting of four chapters includes recent advances in the knowledge of hormonal assays. Recommendations for endocrine therapy are qualified with healthy skepticism for methods which have not passed beyond the experimental stage.

The chapter on ovarian tumors has been enlarged to include a more complete discussion of pathogenesis, gross and microscopic pathology and treatment. Several new illustrations and case reports supplement the text.

The advent of penicillin therapy has led to changes in the subject of gonorrhea in the female. Sarcomatoid growth of the Endometrial Stroma and Hypertrophy of the Uterus are new subjects added to the discussion of tumors of the uterus. The chapter on pelvic anatomy including many excellent illustrations by Tom Jones, remains outstanding for lucid description and inclusiveness.

The extensive experience of the author as a teacher and practicing gynecologist is reflected in many practical suggestions of value in the diagnosis and treatment of pelvic diseases in the female. This textbook should retain its popularity with students, practitioners and specialists.

M. B. S.

SECOND ANNUAL POSTGRADUATE COURSE IN DISEASES OF THE CHEST

The American College of Chest Physicians is sponsoring a second annual postgraduate course in diseases of the chest to be held during the week of September 15-20, 1947, at the Municipal Tuberculosis Sanitarium, Chicago, Illinois. The emphasis in this course will be placed on the newer developments in all aspects of diagnosis and treatment of diseases of the chest. The course will be limited to 30 physicians. Tuition fee is $50.00. Further information may be secured at the office of the American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

The JOURNAL LANCET

Official Journal of the

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Editorials

BLOOD BANKS

The medical profession was justly criticised for indiscriminate blood letting in the past. This practice has now gone into reverse. In olden times the sick were bled to make them well, now the well are bled to make the sick well. We believe every reader will be interested in the contents of the following letter just received from a colleague who has made a special study of blood banks in the United States:

Dr. A. E. Hedback
The Journal-Lancet
Minneapolis, Minnesota

Dear Dr. Hedback:

The following are just a few of the interesting facts in my files relating to blood banks:

The William Buchanan Blood Center, housed in the Baylor Hospital, Dallas, Texas, under the directorship of Dr. J. A. Hill, and which I visited in November, 1945, conducted a blood bank survey corresponding with 100 banks, receiving response from 81, representing 63 cities, and 23 states.

1. 99% stated their bank was organized as a corporation which is similar to our Minneapolis War Memorial Blood Bank.
2. 98% stated their bank was housed in a hospital. Negotiations are now under way to house the Minneapolis War Memorial Blood Bank temporarily in General Hospital.
3. 50% of these banks stated their director as being a pathologist and a personnel of from 1 to 16 people. The Minneapolis Memorial Blood Bank plans for a director, hematogist or pathologist and a personnel of about 10.
4. The banks reporting handled from 10 to 150 donors per day, depending upon the demand. The Minneapolis War Memorial Blood Bank will handle donors for the 12 hospitals in the city.
5. 65% of the banks answering the questionnaire are operating in a 24 hour basis, 5% on a 12 hour basis. The Minneapolis War Memorial Blood Bank plans storage in the individual hospitals which will permit it to operate on an 8 hour basis.
6. The International Hematology and Rh Society had its first meeting in Dallas and Mexico City last year.

I remember your mentioning the work of Dr. Carl Landsteiner at one of the Swedish Hospital meetings. Therefore, I feel that you will be interested in the above developments of blood banks generally, throughout the United States.

Sincerely yours,
Claude C. Kennedy, M.D.

Political campaign slogans of the past come to mind: McKinlay's was "The full dinner pail", Harding's "Back to Normalcy" and Hoover's "A chicken in every pot and two cars in every garage." Physicians throughout the country are now carrying on a campaign and well might the slogan be "A blood bank in every hospital and two lives saved where we saved but one." That should make for normalcy and the full dinner pail. —A.E.H.

American Student Health Association

Annual Meeting in Detroit, Mich., May 7-8, 1948

Host: Wayne University

As retiring President of the American Student Health Association, Dr. Ralph Canuteson of the University of Kansas, has become a member of the Council.

Max L. Durfee, M.D., who has been Director of Student Health in Iowa State Teachers College, Cedar Falls, Iowa, has accepted the directorship of the Student Health Service at Miami University, Oxford, Ohio, and will assume his new duties on September 1, 1947.

Dr. John S. Giffin has been appointed as the new Director of Student Health at Iowa State Teachers College, Cedar Falls, Iowa. Dr. Giffin was in general practice in Cedar Falls following his discharge from the Army, where he was a Flight Surgeon.

Dr. Roger Whitney has been appointed successor to Dr. Leo W. Bortree at Colorado College, Colorado Springs, Colorado, as of July 1st, 1947. Dr. Bortree has resigned because he has been unable to allot sufficient time to carry out a proper health program.

Announcements

Liberalization of the University of Minnesota's nonresident admission policy as it pertains to the school of nursing now permits consideration of the admission applications of young women high school graduates from outside the state who desire to study nursing. Students admitted under this new liberalized policy must meet the required admission qualifications. They must also remain in the nursing program to be permitted to remain in the University. The University of Minnesota nursing program includes basic professional training in nursing leading to the bachelor of science degree, advanced professional training for professional nurses, a certificate course in clinical nursing for professional nurses and a certificate course in practical nursing.

Dr. John F. Fulton of Yale University School of Medicine will be one of the speakers at the meeting of the Ramsey County Medical Society on Tuesday, September 23rd, celebrating the fiftieth anniversary of the founding of the Society's library. The meeting will be held in the Society's Auditorium, 15th floor, Lowry Medical Arts Bldg., St. Paul, at 8:00 P.M. To all members of the medical profession the Society extends a cordial invitation to be present.

Transactions of the North Dakota State Medical Association

60th Annual Session
Fargo, North Dakota, May 25-27, 1947

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SIXTH DISTRICT

R. H. WALDSCHMIDT	Bismarck
C. C. SMITH	Mandan

SOUTHERN

V. D. FERGUSSON	Edgeley
F. E. WOLFE	Oakes

SOUTHWESTERN

A. P. NACHTWEY	Dickinson
R. W. RODGERS, Alternate	Dickinson

STUTSMAN COUNTY

W. W. WOOD	Jamestown
G. HOLT, Alternate	Jamestown

TRI-COUNTY

M. J. MOORE	New Rockford
F. W. FORD, Alternate	New Rockford

TRAILL-STEELE

H. A. LaFLEUR	Mayville
O. A. KNUTSON, Alternate	Buxton

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J. H. FJELDE	Fargo
C. R. TOMPKINS	Grafton
P. H. ROWE	Minot
R. B. RADL	Bismarck
P. T. COOK	Valley City
J. H. MOORE	Grand Forks

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O. C. MAERCKLEIN	Mott
M. W. ROAN	Bismarck
J. W. BOWEN	Dickinson
I. S. AbPLANALP	Williston

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A. P. NACHTWEY	Dickinson
F. I. DARROW	Fargo
F. L. WICKS	Valley City
J. F. HANNA	Fargo
W. A. LIEBELER	Grand Forks
L. W. LARSON, ex-officio	Bismarck
A. E. SPEAR, ex-officio	Dickinson

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A. C. MACDONALD	Valley City
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P. L. OWENS	Bismarck
H. B. HUNTLEY	Kindred
N. W. FAWCETT	Devils Lake
L. H. LANDRY	Walhalla
E. M. WATSON	Fargo
S. CHERNAUSEK	Dickinson
T. Q. BENSON	Grand Forks
E. J. BEITHON	Hankinson
R. C. LITTLE	Mayville
MARY SOULES	New England
W. A. GERRISH	Jamestown
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F. O. WOODWARD	Jamestown
V. J. LaROSE	Bismarck
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M. M. HEFFRON	Bismarck
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E. M. RANSOM	Minot
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J. D. GRAHAM	Devils Lake
K. P. CAVENY	Langdon

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H. J. FORTIN	Fargo
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W. W. WOOD	Jamestown
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A. J. GUMPER	Dickinson
M. W. GARRISON	Minot
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COMMITTEE ON PNEUMONIA

O. W. JOHNSON, Chairman	Rugby
L. H. FREDRICKS	Bismarck
J. E. HETHERINGTON	Grand Forks
W. E. G. LANCASTER	Fargo
W. H. GILSDORF	Valley City
A. W. MACDONALD	Valley City
GUNDER CHRISTIANSON	Valley City

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COMMITTEE ON INDUSTRIAL HEALTH

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COMMITTEE ON MENTAL HYGIENE

M. S. JACOBSON, Chairman	Elgin
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COMMITTEE ON NORTH DAKOTA VETERANS MEDICAL SERVICE

R. B. RADL, Chairman	Bismarck
C. A. ARNESON	Bismarck
W. A. WRIGHT	Williston

REFERENCE COMMITTEES

To consider the report of the President, Secretary and Special Committees:

G. W. TOOMEY, Chairman	Devils Lake
A. H. REISWIG	Wahpeton
H. A. LaFLEUR	Mayville

To consider the reports of the Council, Councillors, Delegate to the A.M.A., and Member of the Medical Center Advisory Council:

P. T. COOK, Chairman	Valley City
C. C. SMITH	Mandan
P. H. WOUTAT	Grand Forks

To consider the reports of standing committees, except the report of the Committee on Medical Economics:

J. D. CRAVEN, Chairman	Willistown
A. R. SORENSON	Minot
A. C. FORTNEY	Fargo

To consider the report of the Committee on Medical Economics:

A. P. NACHTWEY, Chairman	Dickinson
F. E. WEED	Park River
R. H. WALDSCHMIDT	Bismarck
W. W. WOOD	Jamestown
J. R. DILLARD	Fargo
V. D. FERGUSSON	Edgeley
D. J. HALLIDAY	Kenmare

Committee on Resolutions:

F. W. FORD, Chairman	New Rockford
J. D. CRAVEN	Williston
A. H. REISWIG	Wahpeton

Committee on Credentials:

A. C. FORTNEY, Chairman	Fargo
A. R. SORENSON	Minot
H. A. LaFLEUR	Mayville

Proceedings of the House of Delegates of the

NORTH DAKOTA STATE MEDICAL ASSOCIATION

First Session, Sunday, May 25, 1947

The First Session of the House of Delegates was called to order by the Speaker of the House of Delegates, Dr. John H. Moore, at 2:00 P.M., Sunday, May 25, 1947, in the South Room of the Gardner Hotel, Fargo, North Dakota. Dr. A. C. Fortney, chairman of the Committee on Credentials, announced that fifteen elected delegates had presented their credentials and were qualified. The secretary, Dr. L. W. Larson, called the roll and reported the following delegates present: Drs. O. A. Sedlak, alternate, Fargo; A. C. Fortney, Fargo; P. H. Woutat, Grand Forks; F. E. Weed, Park River; J. D. Craven, Williston; A. R. Sorenson, Minot; D. J. Halliday, Kenmare; A. H. Reiswig, Wahpeton; P. T. Cook, Valley City; R. H. Waldschmidt, Bismarck; M. S. Jacobson, alternate, Elgin; V. D. Fergusson, Edgeley; A. P. Nachtwey, Dickinson; W. W. Wood, Jamestown; F. W. Ford, alternate, New Rockford. The speaker declared a quorum present.

Minutes of 1946 Meeting Approved

On motion of Dr. Nachtwey, seconded by Dr. Toomey and carried, the reading of the minutes of the 1946 session as published and circulated in the September 1946 issue of the Journal-Lancet were dispensed with and the minutes adopted.

Introduction of President

The speaker introduced the president, A. E. Spear, who welcomed the delegates to the convention and delivered the following address:

"Mr. Speaker, Members of the House of Delegates and Visitors:

I know you have a great deal to accomplish and are short of time. All the more, on this account do I appreciate your kindness in allowing me to make a few remarks.

I commend and compliment the speaker and members of the House of Delegates on the speed and efficiency with which they do such a fine job.

The success of our organization depends on the unselfish efforts of a great many of our members. I would like to mention and commend a few for their outstanding contributions:

Dr. Ramstad and the Council deserve special mention.

Dr. W. W. Wood has done a great service to the Association as treasurer over a period of twenty-five years. He is asking to be relieved of this responsibility and I think his request is reasonable.

Dr. Larson has done a magnificent job as secretary which should be deeply appreciated.

Dr. Nachtwey has represented us well as a delegate to the A.M.A., and has brought back wonderfully complete reports.

Mr. Engebretson has done an outstanding job as executive secretary, of which I cannot speak too highly, and Mr. Penwarden has been very efficient and successful as director of the Veterans Medical Service.

Outstanding work has been done by the following men and committees:

Dr. Wright and the Committee on Medical Economics; Dr. McCannel and the Committee on Legislation; Dr. Moore and the Committee on Child Welfare; Dr. Toomey and the Committee on Nursing Education; Dr. Radl and the Committee on Veterans Medical Service. Dr. Moore is our representative on the Medical Center Advisory Council and has given us an excellent report.

Other committees have done excellent work and I wish to express to them my appreciation.

It seems in the light of what has happened in the past year that the time to start legislation is the time before it is introduced to the Legislature. You will notice there have not been many bills introduced to which we were opposed. The bill on Nurses Education was a vicious thing and due to Dr. Toomey's work, we were able to amend that bill.

I have very few recommendations to make. On some occasions committees have met and taken action without the knowledge of the president or secretary. I would suggest that the office of the executive secretary be notified in advance of committee meetings and afterwards of the action taken at such meetings. This will make for better integration of the activities of the Association. Especially should this be done during a legislative year. There has been some confusion caused by committees having met and taken action. I think if this suggestion is carried out, it will help things move more smoothly.

On page 10 of the Handbook, Dr. Larson has made three suggestions on matters which have come up during the year, and I recommend all of them for adoption. They are all covered by amendments to the Constitution and By-Laws. I urge the adoption of all three amendments.

On page 42 of the Handbook, Dr. Wright has two suggestions which I heartily endorse. The duties of the Medical Economics committee have increased to such an extent that it is almost impossible for one committee to handle them. I believe that this Committee on Medical Economics should be kept intact but enlarged and that the chairman be authorized to appoint sub-committees within the Economics committee to have charge respectively of voluntary prepayment medical insurance, veterans medical service, and rural medical care, all of them to work under and be responsible to the Medical Economics committee.

Dr. Wright's recommendation that a State Health Council be formed by inter-allied professional groups meets with my approval and should be attempted. I think it would be a very fine thing if the inter-allied groups can be brought together in some kind of an organization so that matters of common interest may be discussed.

I hope that this year we can make voluntary prepayment medical insurance on a service basis available to the entire population of the state and I recommend the House of Delegates to take whatever action is necessary to make this possible.

Last January at their mid-winter meeting in Bismarck the Council at my request authorized the organization of a Women's Auxiliary to the North Dakota State Medical Association. This rightfully would come under the jurisdiction of the House of Delegates. I would like to have the House of Delegates pass a motion today authorizing such an organization. Not that it is necessary, but I would like to see it done.

In regard to the Wagner-Murray-Dingell Bill, I have been informed that a new bill is going to be presented and introduced very shortly. I think it would be a good idea to pass a Resolution unfavorable to this bill and mail it to Senator Smith of New Jersey who is chairman of the committee on hearings on that bill. The fact that there was no legislation passed should not make us rest easy at all. This matter is coming up again. Most surely the President is back of it. Many of the men who are on federal payrolls are backing it.

If the Women's Auxiliary is organized tomorrow, it will be necessary for the new president to appoint an advisory council for this new Women's Auxiliary. I mention this so it can be done.

I feel guilty for having taken so much of your time. Once more I wish to express my sincere appreciation and gratitude for the wonderful cooperation and assistance I have received from all of you."

The speaker then referred the report of the president to the Reference Committee on Reports of the President, Secretary and Special Committees, save that part relative to resolutions, which was referred to the Committee on Resolutions.

Report of the Secretary

Dr. L. W. Larson, secretary, presented the following report, as prepared in the Handbook, which was referred to the Reference Committee on Reports of the President, Secretary, and Special Committees:

The past year has been a milestone in the history of the North Dakota State Medical Association for two reasons. An executive secretary was employed and has served since our last annual meeting, and the Association has developed an administrative set-up to take care of the medical program of the Veterans Administration in the state. The reports of the executive secretary, and also of the director of the Veterans Medical Service Division, indicate the scope of activities of these new officers and departments. I believe that the Association is finally on firm ground and should make notable progress in the coming year.

Membership: The total membership for 1946 was 335. Of this number 322 paid their annual dues, 9 were honorary members, and the dues of 4 members were cancelled because of military service. Eight members died during the past year, and 7 of those who paid dues in 1945 failed to pay their 1946 dues. It is gratifying to note that 16 new members were admitted to the Association during the year.

Table 1 shows the annual membership for the past eight years. You will note that there were more paid memberships in 1946 than in 1944 and 1945. Paid-up memberships, however, during the past three years were considerably less than the preceding five years. The explanation, of course, is that a large percentage of North Dakota doctors were at retirement age when World War II began. They continued to practice and some who had already retired returned to practice. About 60 North Dakota physicians entered the armed forces during World War II and their dues were cancelled. The total membership, including those who paid dues, honorary members, and those in military service, remains at a fairly even level from 1939 through 1945. However, many of the older practicing physicians retired at the end of World War II, and those members who were in military service did not return to the state at once to resume their practices. Accurate data on the return of physician veterans is not available, but it is our impression that the majority of them have returned to the state and are active members at the present time. A few, of course, do not intend to return and several of the younger physicians who were held in their locations during the war by the Procurement and Assignment Service have either moved away from the rural to the urban area, or have left the state to locate elsewhere. The total membership for 1945 and 1946 can be explained by these two factors, and mainly by the retirement of numerous practitioners who would have retired much earlier if it had not been for the war.

TABLE 1

Comparison of Annual Membership

	1939	1940	1941	1942	1943	1944	1945	1946
Paid Memberships	394	387	374	366	331	318	313	322
Honorary Memberships	3	11	12	10	11	10	9	9
Dues Cancelled—military service			14	32	61	59	57	4
	397	398	400	408	403	387	379	335

Table 2 shows that the annual dues for 1947-48 are being paid quite promptly. Twenty-two new members have been admitted this year. They are included in the total of 316 paid-up memberships for 1947-48. A study of the records indicates that several members who are in active practice have failed to pay their current dues. The district medical societies and the councillors should use every means possible to collect the dues of these delinquent members.

TABLE 2

	May 5		April 20		May 5		May 1
	1941	1942	1943	1944	1945	1946	1947
Paid-up Members	339	352	316	304	294	305	316
Honorary Members	12	10	10	10	9	9	8
Dues Cancelled— military service		31	58	59	57	?	0
	351	393	384	373	360	314	324

Field Work: Your secretary has not been able to visit any of the district societies during the past year. President Spear and your executive secretary have met with most of the district societies and have contributed, not only to their programs, but to the welfare of the membership thereby. President Spear should be commended for his diligence in attending these meetings.

Your secretary has continued to maintain his contacts with the American Medical Association and the North Central Medical Conference. He attended the annual convention of state secretaries which was held at the American Medical Association headquarters last December, and also the meeting of the A.M.A. House of Delegates, of which he is a member. Your secretary was honored by the A.M.A. House of Delegates last July by being elected to the Council on Scientific Assembly. This council has general supervision over the scientific meetings during the annual convention of the A.M.A. and is directly responsible for the general scientific sessions which are held at the beginning of the conventions. The annual convention of the American Medical Association at Atlantic City next month will be outstanding for many reasons. It will mark the centennial anniversary of the A.M.A., and appropriate programs have been arranged to celebrate the event. Numerous foreign guests, who are outstanding experts in their specialties, will appear on the scientific program.

Your secretary is a member of the Committee on Rural Medical Service of the A.M.A. This committee sponsored the second annual national conference on rural health in Chicago last February. The members of our state association are urged to read the report of this conference, which has been published in the *Journal* of the American Medical Association, and is available in pamphlet form. The committee is continuing its program of cooperation with the representatives of the major farm organizations throughout the United States. Each of these farm organizations has appointed two representatives to serve in an advisory capacity to the A.M.A. Committee on Rural Medical Service. Each state is kept informed of the program, and is urged to appoint its own state committee on rural medical service to further the program on a state level.

Committees: The reports of the committees, as printed in the handbook, indicate their activities during the past year. As usual, a check of the committees shows that some have been very active, and others have been more or less dormant. The Committee on Medical Economics has had much work to do because of the Veterans program.

RECOMMENDATIONS

1. The Council, meeting in regular session in Bismarck, May, 1946, made a ruling to the effect that the executive secretary should be the convention manager for the annual sessions of our Association in the future. The by-laws of the Association should be amended in such a way that the authority and responsibilities of the executive secretary and the committees of the host society are clearly defined.

2. It is essential that the date of the next annual session and the preliminary arrangements for the meeting place be decided upon not later than September. The reason is that the commercial exhibitors insist on knowing far in advance when and where the next annual session is to be held, and what facilities will be available for their exhibits. The by-laws should be amended to cover this subject.

3. There is need for closer cooperation between representatives of the State Association and the host society on the Committee on Scientific Program. The president and secretary of the State Medical Association are members of the Committee on Scientific Program in order that they may present the viewpoint of the State Association, whom they represent, and also assure more continuity of effort than has been evident in the past. The by-laws should be amended to stipulate the time at which the members of the Committee on Scientific Program from the host society shall be appointed and the date the committee is to meet.

Conclusion: I wish to thank all those who have cooperated with me during the past year in the affairs of the State Association. I wish to particularly commend President Spear for the excellent manner in which he has served as president, and also Dr. Wright, who, as chairman of the Committee on Medical Economics, has had much work to do. It has been a pleasure to work with Mr. E. Forsyth Engebretson, executive secretary. He has an amazing capacity for learning the ropes, and has justified our confidence in him.

Dr. Larson, as a supplementary report, read the following proposed changes to the By-Laws:

Chapter VII, Section 5: All matters concerning the annual session except the composition of the scientific program and arrangements on entertainment shall be managed by the Council with the cooperation of the district society committees. All commercial exhibits shall be within the control and direction of the Council and all income from exhibits shall be paid into the State Association and disbursed by the Council. All matters involving the expenditure of monies must be first approved by the Council and it shall pay all the expenses of the annual session except the cost of entertainment.

Chapter VIII, Section 2: The committee on arrangements shall consist of the local society in the territory in which the annual session is to be held. It shall, by committees of its own selection, cooperate with and aid the Council in procuring suitable accommodations for the meeting places of the Association, of the House of Delegates, of the Council and of their respective committees and shall cooperate with and aid the Council in all arrangements. It shall hold its first meeting on or before the second Tuesday in September for the purpose of making general arrangements for the session. Its chairman shall report an outline of the arrangements to the secretary for publication in the program, and shall make additional announcements during the session as occasion may require.

Chapter VIII, Section 1: The committee on scientific program shall consist of the president and the secretary of the State Association, and three members appointed by the president from the membership of the local society where the annual meeting is to be held. The committee shall hold its first meeting on or before the second Tuesday in December at which time it shall consider all suggested speakers for the scientific program submitted by the members of this Association and shall determine the character and scope of the scientific proceedings of the society, subject to the provision of instructions of the House of Delegates or of the Association, or to the provisions of the Constitution and By-Laws. Thirty days previous to each annual session it shall prepare and issue a program announcing the order in which papers, discussions, and other business shall be presented, which shall be adhered to by the society as nearly as is practicable.

The speaker announced that without objection he would rule that the reading of the supplemental report to the report of the secretary would be construed as a first reading of the proposed amendments. Without objection it was so ordered.

Report of Treasurer

Dr. W. W. Wood, treasurer, presented his report as published in the Handbook:

April 15, 1946, to May 1, 1947

Balance on Hand April 15. 1946		$11,399.88
RECEIPTS:		
Receipts from Dues	$11.742.50	
Final Dividend Closed Carrington	1.20	
Bond Interest	112.50	
Refund from Education Fund (amount not used)	319.66	
	$12,175.86	
		12,175.86
Total Receipts		$23,575.74
DISBURSEMENTS:		
Checks issued:		
6-19-46 Dr. L. W. Larson, executive secretary fund	$ 1.000.00	
7-26-46 Mrs. R. B. Byrne, stenographic service	150.00	
7-26-46 Dr. L. W. Larson, balance, exp. and sal., 1945 and 1946	1,094.82	
7-26-46 R. R. Rosell, 1946-47 dues in North Central Conference	50.00	

8-2-46 Dr. L W. Larson, exp., excutive secretary's office	2,500.00	
8-14-16 Bismarck Tribune, convention program	65.69	
8-14-46 Patterson Hotel, rooms for House of Delegates meeting	43.92	
11-29-46 Dr. L. W. Larson, executive secretary exp.	2,500.00	
1-31-47 Dr. L. W. Larson ($500 to Education fund, $2,500 to Administration fund	3,000.00	
2-10-47 JOURNAL-LANCET, subscription	684.00	
3-20-47 Dr. L. W. Larson, exp., executive secretary	2,500.00	
4-9-47 R. H. Penwarden, Vet. Med. Service	1,500.00	
Total Amount of Checks	$15,088.43	
Bank Expense	2.50	
	$15,090.93	
		$15,090.93
Balance on Hand May 1, 1947		8,484.81
Bonds in Safety Deposit		4,500.00
Total Assets		$12,984.81

REPORT OF CHAIRMAN OF THE COUNCIL 1946-1947

Dr. N. O. Ramstad, chairman, presented the following report, which was referred to the Reference Committee on Reports of the Council, Councillors and Delegate to the American Medical Association:

During the past year the Council of the North Dakota State Medical Association met three times. Two of these meetings were held in conjunction with the 1946 annual meeting of the North Dakota State Medical Association and one, an interim meeting, was held in Bismarck in January, 1947. A quorum was present at each meeting.

The following reports were made and action taken at the May meetings:

Reports. President J. F. Hanna recommended that the President-Elect and the Vice President be encouraged to participate more actively in association affairs and that a liaison be established with the related professions for closer cooperative action.

Secretary L. W. Larson reported a paid membership of 308 and 10 honorary members. He indicated that approximately 30 to 40 of the older men who are more or less inactive or non-resident, have become delinquent in the payment of their dues. He reported that his expenses for the fiscal year were as follows:

	Expenses	Budget
Postage and office supplies	$ 133.43	$ 175.00
Commercial Service, addressing envelopes, etc.	22.00	0.00
Telephone and telegraph	67.14	50.00
Telephone rental, 12 months	15.00	0.00
Travel expense, secretary	157.25	150.00
Total	$ 394.82	$ 375.00
Allowance for secretary's expense and salary		1,200.00
		$1,575.00
Total Expenditures	$1,594.82	
Balance due L. W. Larson on this last fiscal year	1,094.82	

Trasurer W. W. Wood read his report. The Association has invested $4500 in U. S. Bonds and has a balance of $11,399.88 in the bank. The auditing committee of the Council reported that the accounts of the secretary and treasurer had been examined and found to be correct. This report was approved by the Council. The Council also approved the payment of the premiums on the bonds of the treasurer for $20,000.00 and the secretary for $5,000.00.

L. W. Larson reported on the activity of the committee formulated to procure a full-time executive secretary, recommending that he be an attorney-at-law.

W. A. Wright reported on the proposed ararngements with the Veterans Administration. The proposed contract and fee schedule were read.

Action Taken: It was recommended to the House of Delegates that dues for veterans from active service in the armed forces be the full amount of $35.00 for those in practice for six months or more of the year, and one-half of that rate for those in practice less than six months.

It was also recommended that dues for non-resident members and for former members who have completely retired from practice and become inactive be established at $10.00.

It was recommended that E. F. Engebretson be employed by the State Association as a full-time executive secretary, at a salary of $4500 per annum; $1000 to be paid by the State Board of Medical Examiners for services performed.

It was recommended that the proposed contract and fee schedule with the Veterans Administration for the local care of the veteran be passed upon favorably by the House of Delegates. After the House had taken such action the Council approved the establishment of an executive committee of the Council, consisting of N. O. Ramstad, A. D. McCannel, and L. W. Larson as chairman to act in place of the Council in the above matter.

The Council approved the allowance of $200.00 to the Sixth District for meeting the expenses of the session, if such amount was necessary to meet a deficit.

The Council approved the appointment of the executive secretary to the position of state convention manager, to act on the behalf of the Council. All affairs of the convention except the entertainment and the scientific program will be managed by the Council with the cooperation of the district society committees—all income from exhibitors at the state convention shall be paid into the State Association and disbursed by the State Association, and all expenses of the convention except that of entertainment shall be paid by the State Association. It was recommended that the registration fee at future conventions be set at $3.00.

The editorial Committee on Official Publication was reappointed: L. W. Larson, chairman, J. O. Arnson, H. D. Benwell, W. H. Long and G. W. Toomey.

The officers elected to the Council for the coming year were N. O. Ramstad, chairman, and C. J. Glaspel, secretary.

The following budget for the coming year was prepared and approved by the Council:

North Central Conference	$ 50.00
Committee on medical economics	100.00
Stenographer for annual meeting	150.00
Emergency fund for chairman of the Council	50.00
Emergency fund for the Council	200.00
1946 annual meeting	200.00
A.M.A. delegate	175.00
JOURNAL-LANCET	700.00
Travel expenses for the president	100.00
Budget set-up for office of executive secretary:	
Salary, executive secretary	3,500.00
(Medical Examiners Board to make up difference of $1,000.00)	
Rent of office	600.00
Lights	50.00
Telephone, rental and calls	125.00
Stenographer	1,800.00
Office supplies, postage	400.00
Travel expense for secretary	1,000.00
Total Budget	$ 9,200.00
Potential Income (310 members at $35.00 each)	$10,050.00

At the interim meeting in January, the Council took the following action:

The Council accepted the regrets of the Northwest District, which society was unable to entertain the state association meeting because of incomplete hotel accommodations and accepted the invitation of the Cass County Society asking that the meeting be held in Fargo. It was recommended that the convention be held on the 25th, 26th and 27th of May, 1947.

The report of the Committee on Public Policy and Legislation was accepted and approved.

The Council approved the payment of the dues of the executive secretary in the Bismarck Association of Commerce and Kiwanis Club.

The Council recommended that there be an attempt to organize a woman's auxiliary to the North Dakota State Medical Association, such organizational meeting to be held in Fargo, North Dakota, in conjunction with the 1947 annual meeting.

After it had been brought to the attention of the Council that there had been recent meetings of various committees without notification to the state office of the intended time of meeting or subject matters to be discussed, the Council cautioned that all activities of the state association shall be integrated through the state office and strongly recommended that all district societies do likewise; that is, that they should give notice of action taken relating to matters of public relations and matters touching on medical economics.

A report was given by the executive secretary as to the estimated costs in setting up the necessary association facilities for the handling of the North Dakota Veterans Medical Service Division. Mr. Richard H. Penwarden was introduced as a candidate for the position of director of the division. For the operation of the division, the Council approved the transfer of the sum of $5,000.00 from the treasurer to the office of the executive secretary. Joseph Sorkness was added to the executive committee of the Council and said committee was empowered to pass upon all expenditures of the executive secretary, including expenditures necessary for the Division of Veterans Medical Service. The executive committee later reported that Mr. Penwarden had been retained as director.

N. O. Ramstad, M.D., Chairman

As a supplementary report, Dr. Ramstad stated that at the morning session of the Council, two resolutions were passed; one urging that the proposed amendments to the by-laws as recently read by Dr. Larson be approved by the House of Delegates; and the other, a resolution to the effect that the Council recommend that up to 25 per cent of the papers on the scientific program be allotted to doctors from North Dakota in the future.

The speaker referred this supplementary report to the Committee on Resolutions.

REPORTS OF COUNCILLORS

The following reports of the Councillors, as published in the handbook, were referred to the Reference Committee on Reports of the Council, Councillors, and delegate to the American Medical Association:

First District

The following is a resume of the proceedings of the Cass County Medical Society for the year 1946, as submitted by Dr. J. H. Bond, secretary:

During 1946, the Cass County Medical Society held eight regular meetings. Following the custom of previous years, dinners precede the business meetings and scientific programs. Attendance was good and the society was the host of many guests.

A great many of the programs during the year were given over to medical economics and civic problems. As an outgrowth of an address delivered by Dr. Eric Kent Clark, a well known psychiatrist from Minneapolis, a visiting psychiatrist now comes to North Dakota once a week to help in solving some of the childhood problems. Support was also given the campaign waged against the mosquito menace.

State President Dr. A. E. Spear, was a guest of the society at its September meeting at which time he gave an excellent paper on "The Present Status of Legislation with Regard to Localized Medical Practice." Also appearing on programs during the year were Mr. M. E. Koons, director of the Division of Laboratories of the state of North Dakota, E. F. Engebretson, our executive secretary, Mr. Casper Wolhowe, director of the North Dakota Division of Child Welfare, and Senator Shure, Cass county.

In December Mr. Don Eagles reviewed and discussed the Cass County Physicians' Service Plan, which had then been in operation eight months. The successful operation of this plan during its first year is again considered one of the outstanding accomplishments of the society.

The following officers were elected: President, Dr. J. R. Dillard, Fargo; vice president, Dr. B. M. Urenn, Fargo; secretary-treasurer, Dr. J. H. Bond, Fargo; delegate, Dr. O. A. Sedlak, Fargo; alternate, Dr. E. M. Haugrud, Fargo; board of censors, Dr. B. A. Mazur, Fargo.

The First district is pleased to be host to the 1947 annual meeting of the North Dakota State Medical Association and extends its hospitality to each member present.

The following is a resume of the proceedings of the Richland County Medical Society for the year 1946, as submitted by Dr. A. H. Reiswig, secretary:

There have been only six active members but even so, we have had a few excellent meetings during the year. At our November meeting, Dr. H. O. McPheeters of Minneapolis gave an excellent clinic on varicose veins.

We have added one new member to our society, Dr. Elmer R. Wasemiller, Wahpeton. Our membership is now seven. We are hoping to have more meetings during this coming year since things are now gradually coming back to normal.

Paul H. Burton, M.D., Councillor, First District

Second District

The past year was a very uneventful one for the Devils Lake District Medical Society. We have five meetings, at two of which we had outside speakers. At the other meetings, there were case reports and business discussions only. The attendance has been somewhat variable, largely depending on the weather, for a good many of the men in this district have a long way to drive. The only special project that we have started in the past year has been to sponsor an essay contest, which is promoted by the American Association of Physicians and Surgeons, on the subject of "Why the Present System of Medical Practice Gives This Country the Best Medical Service in the World." This contest is being sponsored in all the high schools of the counties of this district, but we have not as yet much indication as to what the response will be.

John C. Fawcett, M.D., Councillor

Third District

The Grand Forks District held eight meetings during the past year, all of which were well attended.

Guest speakers included: Dr. Richard Varco and Dr. J. B. Boehrer of the University of Minnesota; Dr. J. B. Priestley of the Mayo Clinic; Dr. Paul T. H. Thorlakson of Winnipeg; Dr. Ben Somers of St. Paul, and Dr. Lelander Ryba of Chicago, Illinois.

Subjects discussed were: Pre-operative Preparation of Patients from a Nutritional Standpoint; Surgical Treatment of Duodenal Ulcer; Urological Problems; Recent Advances in Hematology; Surgical Lesions of the Abdominal Wall and Problems in the Diagnosis and Treatment of Heart Disease. One meeting was devoted to the discussion of medical economic problems.

We have a membership of 53 (the same as last year) with every physician in the district a member of the society. There was one death during the year, namely, Dr. G. W. Glaspel of Grafton.

The following officers were elected at the January meeting: President, Dr. W. C. Dailey, Grand Forks; vice president, Dr. L. J. Alger, Grand Forks; secretary-treasurer, Dr. E. A. Canterbury, Grand Forks; delegates to state convention, Dr. P. H. Woutat, Grand Forks, and Dr. F. E. Weed, Park River; alternate delegate, Dr. L. H. Landry, Walhalla.

The Traill-Steele Medical Society held three meetings during the past year, all well attended, with Dr. A. C. Fortney of Fargo, Dr. Leif Lohrbauer of Grand Forks, Dr. W. H. Cuthbert of Jamestown and Dr. H. A. LaFleur of Mayville as guest speakers. The subjects discussed were: Poliomyelitis; Eczema; Problems of the State Hospital for the Insane; and Embolism.

The society has a membership of nine and every physician in this district is a member of the society. All are paid up. Officers for 1947 are:

President, Dr. T. M. Cable, Hillsboro; vice president, Dr. H. A. LaFleur, Mayville; secretary-treasurer, Dr. Syver Vinje, Hillsboro; delegate to state convention, Dr. H. A. LaFleur, Mayville; alternate delegate, Dr. O. A. Knutson, Buxton.

The activities of both societies have been efficiently carried out by the officers and peace and harmony have prevailed throughout the year.

C. J. Glaspel, M.D., Councillor, Third District

Fourth District

The Northwest District Medical Society has now a membership of 52 members, having gained 8 new members during this year.

We have held regular meetings each month except July, alternating between Trinity and St. Joseph's hospitals, where the hospital furnished the dinner and gave us very fine facilities for our scientific program.

We held eleven meetings during the year and the meetings were well attended, having an average of 18 at each meeting. During the year we had the following speakers: Dr. V. J. Fischer, on Refrigerated Anesthetic; Dr. Angus L. Cameron, on Special Features of Abdominal Surgery; Dr. F. R. Erenfeld, on Trans-urethral Resection; Dr. Curtis J. Lund of Minneapolis, who discussed Obstetrical Problems; Dr. Francis W. Lynch of St. Paul, who discussed Common Skin Diseases; and motion pictures.

The Northwest District Medical Society was disappointed that we were not in position to entertain the State Medical

Association this year due to the housing shortage as our new hotel will not be completed until this fall, but we are in hopes of entertaining them next year.

At our last meeting we had our executive secretary with us, Mr. E. Forsyth Engebretson, who gave a splendid talk on our new setup to take care of the veterans. It was appreciated by all the members present.

We lost one member by death this year, Dr. H. M. Erenfeld, who had been a member of our society for forty years.

Archie D. McCannel, M.D., Councillor

Fifth District

Our society lost one member during the year, Dr. M. D. Westley, Cooperstown, North Dakota, by death.

The membership of our society now is ten, nine of whom practice in Valley City and one in Cooperstown.

Four meetings of our society were held in Valley City during the year; and our society met once in November jointly with the Stutsman County Society, at which our president, Dr. A. E. Spear, and the executive secretary of the North Dakota State Medical Association, presented papers and information on medical economics.

At one meeting in March, Past-President J. F. Hanna of the North Dakota State Association was our guest speaker.

Officers elected for the year 1947 are: President, Dr. W. H. Gilsdorf, Valley City; Vice President, Dr. J. P. Merrett, Valley City; secretary-treasurer, Dr. C. J. Meredith, Valley City; delegate to state convention, Dr. P. T. Cook, Valley City; alternate, Dr. A. C. Macdonald, Valley City.

Excellent harmony and cooperation prevails in our society.

C. J. Meredith, M.D., Chairman

Sixth District

During the past year four meetings were held which were well attended.

The secretary reports a membership of 56.

Participating in our programs were Dr. Derauf, St. Paul, who discussed Fractures of the Tibia; Dr. John Waugh, Rochester, Minnesota, who presented his observations on the management of acute abdominal emergencies; one meeting was given over to the study of Cancer under the leadership of Dr. L. W. Larson. Participating were Drs. R. B. Radl, G. M. Constans, P. W. Friese, C. W. Schoregge, C. H. Peters, N. O. Brink and H. M. Berg. Dr. B. J. Branton, Willmar, Minnesota, presented a paper on Prepaid Medical Plans. Mr. Don Eagles presented the Blue Cross Plan and Mr. Richard Penwarden discussed the Veterans Medical Care Plan.

The present officers of the Sixth district are: President, C. J. Baumgartner, Bismarck; vice president, H. A. Wheeler, Mandan; secretary-treasurer, T. W. Buckingham, Bismarck; censor, C. A. Arneson, Bismarck.

New members admitted during the year were: E. J. Laskowski; A. M. Thompson; John Cartwright.

The meetings were well attended and good fellowship and professional interest prevailed.

N. O. Ramstad, M.D., Councillor

Seventh District

Three meetings of the Seventh District Society were held during the past year. On October 1, 1946, a meeting was held with Dr. Spear and Mr. Engebretson as guests, who spoke on problems of the State Medical Association. Five guests from Valley City were present. On November 29, 1946, Dr. Joel C. Swanson was the guest speaker and reported on the recent poliomyelitis epidemic.

On January 23, 1947, election of officers was held and a film depicting the technic of operation for carcinoma of the rectum was shown. The following officers were elected: President, E. J. Larson, Jamestown; vice president, W. H. Longstreth, Kensal; secretary-treasurer, R. D. Nierling, Jamestown; delegate, W. W. Wood, Jamestown; alternate, George Holt, Jamestown; censor, W. A. Gerrish, Jamestown.

A committee on cancer was appointed, consisting of E. J. Larson, P. G. Arzt and T. L. DePuy.

Two members of the society, Dr. Francis Peake and Dr. T. L. DePuy, died during the past year. Two new members were added to the roster, Drs. John Ellsworth and James L. DePuy. At this date, 15 members have their dues paid up as compared with 14 a year ago.

Joseph Sorkness, M.D., Councillor

Eighth District

One meeting was held in the Southern District, this being at Ellendale March 12, 1947. Mr. E. F. Engebretson, our executive secretary, was present as was Mr. R. H. Penwarden of the Veterans Service Division. Mr. Engebretson explained some of the laws affecting the medical profession, especially those passed by the last legislature. Mr. Penwarden outlined some of the formalities incident to the medical care of veterans.

Drs. George Haynes and A. Veitch of Lisbon were guests at the meeting.

Dr. Basil W. Maloney of Hammond, Indiana, will open an office for the practice of medicine at LaMoure, which city has been without a resident physician for a considerable time.

F. W. Fergusson, M.D., Councillor

Ninth District

The Ninth District was relatively inactive this year, only three meetings being held.

At the August 29th meeting, Drs. L. J. Seibel and D. W. Matthaei gave a report on the polio conference which they had recently attended at Minneapolis. The polio situation was discussed.

At the December 18th meeting, the Cass County Medical Insurance Plan was discussed and officers elected for the ensuing year.

A meeting was also held on April 16th.

A. E. Westervelt, M.D., Councillor

Tenth District

The Southwestern Medical District Society has 21 members. One member, Dr. M. W. Lyons, is now practicing in Minneapolis. We have two new members, Dr. Charles Vogl of Bowman and Dr. Ralph Dukart of Richardton.

Due to the shortage of doctors in this community and the bad roads, only two society meetings were held during the year of 1946. Professional papers had been planned for each meeting but in each case they were not given due to lengthy discussion of other problems.

Our first meeting was held April 20, 1946, and about three-fourths of the society was present. After routine business a discussion was held concerning a physicians' pre-payment medical plan. It is now functioning in Cass County. Our society approved the plan and our delegate were instructed to so advise at the next state medical meeting.

The other meeting was held November 2, 1946, following a dinner for the society at the St. Charles Hotel, Dickinson. Routine business and election of officers was accomplished. Our state executive secretary, Mr. E. Forsyth Engebretson, was guest at our meeting. He gave a resume of his present duties and planned duties for the coming year. Dr. A. E. Spear outlined the Hill-Burton Hospital Plan. This was followed by detailed discussion by society members.

A. R. Gilsdorf, M.D., Councillor

REPORTS OF STANDING COMMITTEES

The following reports of the Standing Committees were referred to the Reference Committee on Reports of Standing Committees:

Medical Education

On behalf of your Committee on Medical Education, I would report as follows: In addition of standing by to answer questions and give advice when called upon, the members of the committee met at the University on November 12, 1946. Present at this meeting were Dr. C. R. Tompkins, Dr. P. H. Rowe, Dr. John Moore, and the chairman. Dr. J. H. Fjelde and Dr. Paul T. Cook had expected to come, but were unable to attend; Dr. R. B. Radl also was unable to be present. The committee met at 10:00 A.M. and continued in session until noon, at which time it went on with its discussions around the lunch table and adjourned about 2:00 P.M.

In addition to discussing many details of both the operation of the school and the work of the North Dakota Medical Center Advisory Council, it adopted a resolution indorsing the work and plans of the council and urging the legislature to adopt the plan and make the necessary appropriations.

Meanwhile the Medical Center Advisory Council created by the legislative session of 1945 had had four meetings, one in 1945, and three in 1946. It had devoted much time to investigation, study, and planning. At its last meeting, October 29, 1946, it approved a tentative budget for a four-year school prepared by its director, Mr. John A. Page, and authorized him to work for appropriations for both the operation of the school and an initial unit of hospital construction. The Board of Higher Education, the Budget Board, and others in leadership, however, later did not deem it wise to urge the appropriations at this time.

But the legislature did pass a resolution authorizing a popular vote at the time of the next general election upon the question of a mill levy to support the state medical center. The legislature also renewed the appropriation for a Medical Science building originally made in 1945. It increased the appropriation from $240,000 to $400,000. It is to be hoped and expected that in the coming biennium this building can be constructed. The legislature also made an appropriation for the maintenance of the two-year school that is considerably better than the school has ever had before.

In the meantime, also, the school has continued to operate as a two-year medical school upon the plan and under the circumstances that are well known to you. This year it has gone back to the prewar policy of having one academic year beginning in September and closing in June, instead of the accelerated program demanded by the Army and Navy in the three years just preceding. It has also gone back to its policy of giving prime consideration to well qualified applicants from the state. It has little or no room for non-resident applicants. During the war this policy has been somewhat disturbed. The Army and Navy simply assigned certain quotas of students to the school, and these might be from many parts of the United States.

Its status before the Council on Medical Education of the American Medical Association remains as before. Those that complete the curriculum, however, have been able to transfer to other schools to the same advantage that they have always obtained. Twenty-two men completed the two-year curriculum in Medicine in 1946 and all were accepted in other schools and are now continuing their clinical work elsewhere. Ten of these were accepted at the University of Illinois, six at Temple University, and from one to two were accepted in other schools until the entire number had been accounted for.

This is being written at the time that arrangements for transfers are being made for the class to finish in June, 1947. Twelve students have already been accepted, two at Pennsylvania, two at Bowman Gray, three at Northwestern, one at Nebraska, one at Vanderbilt, one at Southwestern, one at Creighton, and one at Harvard.

H. E. French, M.D., Chairman

Necrology and Medical History

Again we pause in accordance with traditions of our profession to mark the passing of those of our ranks who have been called for the Great Adventure since we last met.

We attest to their faithfulness to colleagues and friends; to their fidelity in adherence to the ethics of our calling and we extend sincere sympathy to their survivors, who in larger measure, mourn their departure.

Our faith and strength is increased by their example of duty well performed in service to mankind.

ALEX R. MacKAY

Dr. Alex R. MacKay, 75, retired physician of Bottineau, passed away on April 20, 1946, at St. Petersburg, Florida, where he and Mrs. MacKay had spent the winter. Dr. MacKay graduated from the medical department of Trinity, in Toronto, Canada, and was licensed to practice his profession in North Dakota in October of 1898. He located in Bottineau and there he served for forty years, becoming widely known and highly respected as a practitioner of medicine and surgery. Funeral services and burial were at Bottineau. So, at rest, is another of our truly pioneer colleagues. Surviving Dr. MacKay, beside his wife, are one son, Dr. Alex MacKay, of Spokane, Washington, and two daughters, Mrs. Marion Schmidt, of Scott's Bluff, Nebraska, and Mrs. Kenneth Malvey, of Bottineau.

SAMUEL RAINVILLE

Dr. Samuel Rainville, 71, died May 1, 1946, at his home in Crosby, North Dakota, where he had practiced his profession for more than thirty years. Dr. Rainville was a native of Glen Falls, New York, and came as a small boy with his parents to Minneapolis, Minnesota. Later the family moved to Devils Lake, North Dakota, where he graduated with the first class of the high school of that city. After a period of teaching he entered the College of Physicians and Surgeons at Minneapolis, Minnesota, and graduated in 1897. He was licensed in North Dakota in April of 1900. Dr. Rainville served his community in many positions of trust and at the time of his death was health officer and coroner of Divide county. Previous to his location at Crosby he had practiced at Leeds and Minnewauken. Dr. Rainville is survived by his wife and two daughters, Mrs. J. A. Kennedy of Tacoma, Washington, and Helen, of Los Angeles, California.

GEORGE W. GLASPEL

Dr. George W. Glaspel, 81, passed from this life on June 27, 1946, at his home in Grafton. He was a native of Oshawa, Ontario. He graduated from the University of Iowa in 1888 and soon thereafter located at Hillsboro, removing a few months later to Grafton upon the death of his brother who held that location. Here he remained for the balance of his allotted time, dearly beloved and held in the highest esteem by the residents of a large area. Dr. Glaspel was a member of the first medical examining board of our state. It is said that he knew and used every type of conveyance to the side of his patients and inclemency of weather never prevented his calls of service. Truly a pioneer physician who always upheld the finest traditions of our profession. Dr. Glaspel was a member of the Masonic fraternity. Survivors are a daughter, Mrs. Muriel Cryderman, of Grafton, and a son, Dr. C. J. Glaspel, also of Grafton, who was elected to the presidency of our medical association in 1940.

HANS HAUGEN

Dr. Hans Haugen, 70, died on July 11, 1946, in his office in Fargo as the result of a heart attack. Dr. Haugen was a native of Norway and came to North Dakota at the age of 16. He attended Fargo College and graduated from Northwestern University in 1906 and was licensed to practice medicine in October of the same year. After serving for a few years each at Davenport and Kindred, North Dakota, he chose Fargo in 1918 for his location and remained there in practice until the time of his passing. Dr. Haugen was much interested in music and was a member of the Orpheus male chorus and the Fargo-Moorhead lyric male chorus, the latter singing at his funeral. He was a member of the Sons of Norway, the Modern Woodmen of America, and the Knights of Pythias. Dr. Haugen is survived by Mrs. Haugen, two sons, Walter and Martell, at home, and a daughter, Mrs. John E. Gwyther, also of Fargo.

FREDERICK BISMARCK STRAUSS

Dr. Frederick Bismarck Strauss, 68, died in a Bismarck hospital, July 26, 1946, following several years of ill health. Dr. Strauss was one of the first white children born in the Bismarck area. He took his undergraduate work at St. John's University, in Minnesota, and graduated in medicine from Rush with the class of 1901, and was licensed in North Dakota October 15, 1901. Dr. Strauss practiced in Glen Ullin and Richardton before locating in Bismarck, where in 1919, with Dr. Roan the clinic bearing their names was formed. He had served as Bismarck health officer, Indian School physician and as medical director of the Workmen's Compensation Bureau. Dr. Strauss was discharged from the army of World War I with the rank of captain. He had served as national president of the alumni association of St. John's University. He had served as district governor for Lions International. His lodge affiliations were Knights of Columbus, Elks, Foresters and the A.O.U.W. His hobbies were short-story writing, hunting and fishing. His survivors include Mrs. Strauss, two sons, Frederick Jr., Ernest E., and a daughter, Mrs. Cora Marie McPartlin of Chicago, Illinois.

THOMAS LLOYD DePUY

Dr. Thomas Lloyd DePuy, 59, died in a Jamestown hospital October 24, 1946, after a two weeks illness due to a heart ailment. Dr. DePuy was born in Jamestown, son of a pioneer physician, with whom, after graduation, he was associated in practice. He attended Jamestown high school and the University of Michigan, graduating from the New York Medical College with the class of 1912. He was licensed to practice in North Dakota January 9, 1914. Dr. DePuy was a veteran of World War I and returned to Jamestown after his discharge from service. In 1928 Dr. Joseph Sorkness became associated with Dr. DePuy and later the clinic bearing their names was formed. Dr. DePuy was very civic minded and was associated with every movement looking to the betterment of his community. He was especially interested in athletics and out-door sports. In his memory an electric scoreboard is to be erected at the local athletic field. He has served as president of the Jamestown Board of Education; was an elder of the Presbyterian Church; president of the hospital staff; a past president of the Rotary Club; a member of the American Legion as well as all Masonic bodies, the Elks, the A.O.U.W., the Sportsman's Club and local and state medical associations. He had served as coroner of Stutsman county. Dr. DePuy is survived by Mrs. DePuy, two sons, Dr. James DePuy, now associated with the DePuy-Sorkness Clinic, and Richard Gay, Jamestown college student; two daughters, Mrs. Ray Qualley, Dayton, Ohio, and Mrs. Merle Larson, Jamestown, and a sister, Mrs. B. V. Nierling, also of Jamestown.

FRANCIS PEAKE

Dr. Francis Peake, 77, died at his home in Jamestown October 26, 1946. He was a native of Hamden, New York. After graduation in 1894 from a Chicago medical school he was located at Champaign, Illinois, for a year. He then came to the Northwest, practicing at Pelican Rapids and Alexandria in Minnesota, and at Valley City in North Dakota. He located in Jamestown in 1908. Dr. Peake was a trustee of the Methodist church; a member of Masonic bodies, the Jamestown Chamber of Commerce, and local and state medical societies. Survivors include a daughter, Marion, of Jamestown; a son, Dr. Cyrus Peake, now in Tokyo in government service; two brothers and two grandchildren.

JULIUS O. ARNSON

Dr. Julius O. Arnson, 58, died in a Bismarck hospital October 29, 1946, after a few days illness of coronary thrombosis. He was a native of Eau Claire, Wisconsin, where he attended high school. His undergraduate work was taken at Hamline University, St. Paul, Minnesota, and he graduated from Northwestern University with the class of 1911. He was licensed to practice in North Dakota July 9, 1915. Dr. Arnson was a partner in the Quain and Ramstad Clinic in Bismarck, and was widely known as internist and cardiologist. He had practiced for a short period of time at Kimball, Minnesota, before coming to Bismarck. He served as a major in the armed forces of World War I and saw service in France. Dr. Arnson was active in civic matters and especially interested in youth and their organizations. One of his chief interests was helping needy young men through college, especially medical schools. He was governor of the American College of Physicians for North Dakota for many years; an associate editor of the JOURNAL-LANCET, and was Blue Lodge and 32nd degree Scottish Rite Mason. Dr. Arnson was a member of the American Legion and local and state medical associations, serving the latter as chairman of the committee on tuberculosis. His only survivor is a brother, Dr. J. M. Arnson, of Benson, Minnesota. Burial was in the family plot at Eau Claire, Wisconsin.

BERNARD S. NICKERSON

Dr. Bernard S. Nickerson, 70, passed away in a Bismarck hospital after an illness of several weeks, on November 24, 1946. Dr. Nickerson was born at Linneus, Maine, received his high school education at Monticello, Minnesota, and his academic and medical degrees from the University of Minnesota. He graduated in medicine in 1903 and was licensed in North Dakota July 6, 1912. He located in Mandan in 1912 and practiced there to the end of his time. Dr. Nickerson was a veteran of World War I, serving as a major and seeing overseas service. He was active in community affairs; was a member of Masonic bodies, including Commandery and El Zagel Shrine. He was a member of the Rotary club, American Legion, Military Order of the Loyal Legion of the United States, and the American College of Surgeons. He was also a member of both local and state medical groups. Dr. Nickerson leaves Mrs. Nickerson, one son, Kenneth, sergeant of the A.U.S., a sister, Mrs. W. G. Babcock, and a brother, Clarene, both of Minneapolis, Minnesota.

GEORGE D. CROSETTE

Dr. George D. Crosette, 64, passed away at his cottage in Morris, Minnesota, on November 29, 1946. Dr. Crosette was graduated from the University of Minnesota with the class of 1904 and was licensed in North Dakota January 7, 1916. He practiced for many years at Richardton, and later served as police surgeon in St. Paul, Minnesota. Survivors are Mrs. Crosette, a son, Joseph, St. Paul, Minnesota, and a brother, Dart, of Lansing, Michigan.

J. O. CARR

Dr. J. O Carr, 76, died at Whitfield, Massachusetts, on November 30, 1946. He was a native of Pittsburgh, Pennsylvania. He was graduated from Jefferson Medical College, May 15, 1896, and was licensed in North Dakota July 5, 1929. Dr. Carr was superintendent of the state hospital at Jamestown from 1928 to 1936. Dr. Carr saw military service with the Pennsylvania National Guard on the Mexican border in 1916 and with the 111th Infantry, 28th Division, in World War I. Dr. Carr was past commander of the Jamestown post of the American Legion and active in the Rotary and Country clubs. He was a past president of the North Dakota Society of the Sons of the American Revolution. At one time he was chairman of the Stutsman County chapter, Amerian Red Cross. He held membership in the local and state medical societies. Survivors are Mrs. Carr and two daughter, Wooda and Carlotta.

RALPH EDGAR PRAY

Dr. Ralph Edgar Pray, 49, died on December 18, 1946, in a hospital in San Francisco, California, some time after surgery for the removal of a tumor of the brain. He was a native of Valley City, North Dakota, and obtained his education at the local high school, Shattuck Military Academy, the University of North Dakota, the University of California, and graduated in Medicine from the University of Pennsylvania with the class of 1925. He interned and took postgraduate work at the Children's Hospital in Philadelphia, pediatrics being his specialty. He was licensed in North Dakota January 7, 1927. Dr. Pray served in both world wars, as a second lieutenant in War I, and was discharged from service from War II as a lieutenant colonel. He served three years overseas. He was a son of pioneer residents of Valley City, North Dakota, Dr. and Mrs. E. A. Pray. He came to Valley City in 1927 and was associated in practice with his father. He became connected with the Dakota Clinic in Fargo, North Dakota, in 1928, as pediatrician. He was associated later in the same capacity with the Fargo Clinic. Dr. Pray left North Dakota in 1941 to locate at Salinas, California, from whence he entered the A.U.S. for service in World War II. Symptoms of his illness were noticed while he was in France and he was flown home and discharged from service. Dr. Pray was a Fellow of the American Academy of Pediatrics; a diplomate of the American Board of Pediatrics and a member of local and state medical groups. Survivors are Mrs. Pray, a son, Martin, and a daughter, Davis Ann; a brother, Dr. L. G. Pray of Fargo, another brother, Russell H. of Berkeley, Calif., and three sisters, Mrs. John Julian, Albuquerque, New Mexico; Mrs. Gordon Battey, Fort Pierce, Florida; and Mrs. E. F. Balsbaugh, Alexandria, Virginia.

HARRIS M. ERENFELD

Dr. Harris M. Erenfeld, 77, passed away in Trinity Hospital, at Minot, North Dakota, January 16, 1947. He had been in failing health for some time but his fatal illness was of ten days' duration. Dr. Erenfeld was a native of Vienna Austria, son of Dr. Emil Erenfeld. He was graduated from the University of Vienna in 1897 and was licensed in North Dakota, October 15, 1905. He interned at the General Hospital in Vienna and for a number of years was a surgical assistant to Professor Rochenegg. Dr. Erenfeld first located at Anamoose, North Dakota, and relocated at Minot in 1914, becoming associated with a group of physicians in the Minot Clinic. Dr. Erenfeld was a director of the Minot Country Club and a member of the Elks Lodge. He was a member of local, state and national medical societies. In his youth he was a member of the cavalry unit and retained his interests in horses, outdoor sports, golf, skating and hunting to the end. Surviving are Mrs. Erenfeld, a daughter, Mrs. William J. O'Brien of Billings, Montana, and a son, Dr. Fred Erenfeld, who was associated with his father.

CHARLES E. HOOD

Dr. Charles E. Hood, 80, died January 29, 1947, in the University Hospital at Ann Arbor, Michigan. Dr. Hood was a native of Amherstberg, Ontario, and was graduated from the Detroit Medical College in 1898 and was licensed in North Dakota April 13, 1899. He served at a number of locations in North Dakota, including Drayton, Cavalier, Souris, and Lansford. Surviving is a daughter, Marguerite V. Hood, widely known in music circles of our state, who teaches music education at the University of Michigan.

FRED FOSTER STOCKING

Dr. Fred Foster Stocking, 67, died April 10, at Stockton, California. Dr. Stocking was a native of Texas, where he received his college degree, and later graduated from Rush Medical College with the class of 1906. He held several locations in Minnesota and for a period of four years was industrial surgeon for the Calumet and Helca Copper Company of Calumet, Michigan. Since August 1945 he has held the position of medical rating specialist of the regional board of the Fargo Veterans Administration. Survivors are two daughters, brothers and sisters. Burial was held at Fargo, North Dakota.

RODGER H. MATTSON

Dr. Rodger H. Mattson, 55, passed away June 1, 1946, at his home in Bayport, Minnesota, after an extended illness. He was born in Wells county and was a memebr of the first graduating class of the New Rockford High School. Dr. Mattson graduated at the University of Minnesota with the class of 1920 and was licensed to practice in North Dakota on July 4, 1924. After short periods of service at Minneapolis and Stephen, Minnesota, he located in New Rockford, later going to McVille to become associated with the late Dr. A. O. Arneson. He held this location until removal to Minnesota in 1944. He is survived by Mrs. Mattson and three children besides his mother, a brother and a sister. One son, Roger P. Mattson, is enrolled in the medical school of our university.

F. L. Wicks, M.D., G. M. Williamson, M.D.,
Co-Chairmen.

Public Policy and Legislation

Our committee met with the Councillors on January 12, 1947. We discussed the different matters coming before the legislature, especially those that had any bearing on the medical profession.

Our executive secretary kept in touch with the legislative session on the various bills discussed and I think did a splendid job in meeting with the committee.

The North Dakota State Medical Association was instrumental in presenting one bill to the legislature for the control of the manufacture and sale of fireworks in North Dakota. The bill we presented was copied after the bill passed in Minnesota in 1941 but the committee of the legislature made certain changes in the bill, and although the bill which was finally passed is a great improvement on the old, it is not everything to be desired.

This committee did not call for any money this year as our legislative program was handled entirely without cost to the Association.

The bills discussed by our committee were the Hospital Licensure bill which was a compromise bill and was not all to be expected, but we feel it is the best that could have passed at this session of the legislature.

The Practical Nurses bill was also a bill that was discussed by our committee but the one finally passed was quite different from the original bill presented by the Nurses Association. We feel that all the objectionable features were removed in the bill we finally recommended for passage.

The Optometry bill was also considered by our committee and we feel that it was a bill, the passage of which would be to the best interests of the citizens of North Dakota, so we recommended its passage.

House Bill 23 was also approved by our committee, which provided for licensing and supervision of maternity homes for unmarried mothers by the Division of Child Welfare of the Public Welfare Board.

House Bills 46, 47 and 48, relating to school lunches, the committee concluded should be supported.

House Bill 127, the Chiropractic Hospital Licensure bill pertaining to the licensure of chiropractic hospitals, was opposed by the committee on the grounds that all hospitals should be treated in the same manner if a licensure program is to be enacted.

Archie D. McCannel, M.D., Chairman

Public Health

The Committee on Public Health of the State Medical Association met in Bismarck, November 24, 1946. The following resolutions were discussed and passed upon favorably:

1. That service health units be established according to law in counties requesting full-time health service, and that the duties of the health officer be carried out by a part-time county health officer, so that the basic services which can be established within the financial means of the county be started.
2. That all activities in relation to the production, distribution and manufacture of milk and milk products should be consolidated within the jurisdiction of the State Department of Health.
3. That all activties in relation to the inspection of restaurants and other establishments offering food for sale be consolidated within the jurisdiction of the State Department of Health.
4. That the State Department of Health furnish reports in book form to be used in making reports of immunizations, the blanks to be in triplicate, one to be given to the patient, one retained by the physician for his file, and one forwarded to the State Department of Health for statistical purposes.
5. That the prenatal legislation sponsored by the State Department of Health has the approval of the Public Health Committee and it is further recommended by the committee that Rh factor typing be done on all serological specimens submitted to the State Public Health Laboratories in compliance with the prenatal legislation if passed.

R. O. Saxvik, M. D., Acting Chairman

Official Publication

This committee has not had a meeting during the past year. Its relations with the Journal-Lancet have been satisfactory. Unfortunately, no one on the committee has had time and/or ability to prepare editorial material for the Journal-Lancet. It would be well if some physician, who is interested in, and has a flare for, writing, could be found to serve as chairman of the Committee on Official Publication. The Journal-Lancet is most anxious to cooperate with us in every way possible, and our official publication could be of more interest and value to our members.

L. W. Larson, M.D., Chairman

Tuberculosis

Tuberculosis ranks highest in the mortality table of communicable diseases. This fact must make us conscious of the great responsibility before us whose duty it is to continue the control of this insidious disease.

Our sanitarium, Public Health doctors, nurses, technicians and interested laymen have done a commendable job, but it must be admitted there have been shortcomings due to the war effort and shortage of personnel.

The work of two units of microfilm x-rays was instituted last year. Considerable criticism has been directed against their use. One has been that too few films were taken, that is, only a relatively small percentage of actual films were taken as compared to the capacity.

This can be explained: Considerable advance publicity is necessary in order to bring out the people. This responsibility, in a great part, rests with the community, local doctors, newspapers, service clubs, PTA, and all local organizations. Their cooperation is necessary if we are to obtain larger percentage of the people reporting for mass x-rays.

Much criticism about the use of the units in the hospitals during the winter months has been heard from the medical profession. It is true that only a relatively few microfilms were taken during this time. But it must be recalled to our attention that these units are operated by technicians who are employed for the year, and it is not practical for them to travel during the months from November to April.

It is still too early to evaluate the net results obtained from the two x-ray microfilm units, but the committee hopes to have this available in the next few months.

Dr. Smith reports that the department averaged 252 films a day during the 121 working days between April 1946 and December 1946, and this admittedly without any advance agent or publicity except the local newspaper.

The Department of Health at the time of this report has no data tabulated of the number of active or suspected cases of tuberculosis found.

Radiologists report finding other pathology, i. e., especially cardiac conditions and tumors, which enhances the value of this mass x-ray program.

The committee recommends the continued use of tuberculin tests and feels that more of this work should be performed both by the Department of Health and by the doctor with proper follow-up.

Miss Katen reports that the North Dakota Anti-Tuberculosis Association pays $5.00 for 14x17 x-ray and $5.00 for examination of the TB patient if necessary.

The committee recommends this fee as sufficient and wished also to remind the doctors to be conservative in the use of this fund.

The committee reviewed methods of reporting TB cases. To date doctors have failed to report satisfactorily to the Department of Health. The committee recommends that form No. 4

be filled in by the doctors and mailed to the Department of Health.

Miss Katen stated the North Dakota Anti-Tuberculosis Association would pay for refresher courses for doctors interested. The committee accepted this offer and sponsorship, for the reason that much of the work will continue to be decentralized for the pneumo refills and after-care of cases throughout the state.

The committee recommends the present tubercuolsis program be continued but intensified.

A. F. Hammargren, M.D., Chairman

The following have advised and cooperated with the committee in making this report:

William M. Smith, M.D., acting state health officer; H. M. Berg, M.D., Bismarck, representing the roentgenologists of the state; Oswald P. Erickson, M.D., assistant surgeon, U. S. Public Health Service; Miss Helen Katen, executive secretary, North Dakota Anti-Tuberculosis Association.

* * * * *

The executive secretary, in the absence of Dr. Hammargren, read a supplemental report to the report of the Committee on Tuberculosis, which was referred to the Reference Committee on Reports of Standing Committees:

"We can now state that the 70 mm. film survey program is beginning to run more smoothly. Many personnel problems have been encountered and are still present. There have been numerous technical difficulties. In spite of these obstacles as many 70 mm. films have been taken in the six weeks which the program has been in full operation this year, as in twelve months last year.

The technique is gradually being improved. The time between the taking of the film and the sending out of the report is gradually being decreased.

The present method of sending 14x17 films which have been taken as a result of 70 mm. film survey to Dr. Wallbank for interpretation has overloaded the capacity of the sanatorium staff.

Therefore, at the suggestion of Dr. Wallbank and after discussion of this problem with Miss Helen Katen of the North Dakota Anti-Tuberculosis Society, Dr. Erickson of the United States Public Health Service and the North Dakota Health Department, Dr. H. M. Berg, president of the North Dakota Radiological Society, and Dr. A. F. Hammargren, chairman of the North Dakota Committee on Tuberculosis, the following is recommended:

1. All 14x17 films of chests on private patients in which the doctor desires consultation in the interpretation of film should be sent to a radiologist, and not to Dr. Wallbank.
2. On patients who are unable to pay for 14x17 film, authorization should be obtained from the North Dakota Anti-Tuberculosis Society, through the city or county health nurse for the 14x17 film. The film can be sent to the State Health Department who will arrange to have it interpreted by a radiologist or it can be sent directly to a radiologist.
3. 14x17 follow-up films on patients who have been in the sanatorium should continue to be sent to Dr. Wallbank directly.
4. 14x17 films on patients who the doctor feels should be admitted to the sanatorium should be sent to Dr. Wallbank with a summary of the doctor's findings."

A. F. Hammargren, M.D., Chairman

Cancer

The Committee on Cancer has confined its activities during the past year to the program of the North Dakota Division of the American Cancer Society. The reorganization of the American Cancer Society, which was developing at the time of our last report, has been completed, and the society is now a truly *American* society, in which each state has a voice in its affairs. Ten million dollars was raised by the society last year. North Dakota oversubscribed its quota by 60 per cent. Forty per cent of the money raised in the state was sent to the American Cancer Society to further its program of education, research and service. Five out of every eight dollars obtained by the American Cancer Society from the states has been allocated to a research fund. A major portion of the two and one-half million dollars from the 1946 campaign has already been allotted to research institutions throughout the United States, upon the recommendation of a special committee on Growth, which has been named by the National Research Council. A coordinated effort, directed toward the cause of cancer and better methods of diagnosis and treatment, is assured through this new set-up.

The service program of the American Cancer Society, as developed in other parts of the country, and which involves the establishment of so-called detection centers, has been given thorough study by the Executive Committee of the North Dakota division, membership of which includes those on the Cancer committee. The idea of the "cancer detection clinic" was approved by this House of Delegates a year ago, and has been given approval also by the House of Delegates of the American Medical Association. Your committee is studying the advisability of encouraging the development of cancer detection clinics in North Dakota. These clinics are designed to detect abnormalities which do not produce symptoms sufficient to send the patient to the doctor. They do not diagnose or treat disease. The clinics cannot be established in any community without the approval of the local district medical society. Each district medical society is again urged to appoint a special committee on cancer, in order that it may study the program of the North Dakota division of the American Cancer Society, and be in a position to recommend approval, or rejection, of any program which may be suggested by the North Dakota division. Basic principles governing the establishment of detection centers have been developed by the American Medical Association. The American College of Surgeons has undertaken the job of inspection of these centers, so that they will be properly organized and operated.

Cancer still remains the second cause of death in North Dakota. People are being taught to recognize the danger signals which may mean cancer, and to consult the family physician early. It is the duty of every medical practitioner to inform himself concerning the diagnosis of early cancer, and the approved methods by which cancer can be cured. Every physician should cooperate whole-heartedly with the volunteer lay workers in the state who are making an honest effort, through the program of the North Dakota Division of the American Cancer Society, to decrease the death toll from cancer.

L. W. Larson, M.D., Chairman

Fractures

There have been no meetings of the Committee on Fractures during the past year. There have been no suggestions submitted for any changes in our program policy carried out during the past several years. Several communications have been received from the chairman of the National Fracture Committee urging us to become more active in the endeavors of our state committee.

R. H. Waldschmidt, M.D., Chairman

Maternal and Child Welfare

Your Committee on Maternal and Child Welfare met in Bismarck on April 12, 1947. Members present were Drs. Friese, Ransom, Dyson, Graham, Saxvik, and Caveny. Dr. Friese presided as acting chairman in the absence of the chairman and Dr. Saxvik, acting state health officer, became the acting secretary of the committee.

The licensing of maternity homes, nursing homes and hospitals, as provided by the last session of the North Dakota legislature and which will become effective July 1, 1947, was discussed. The committee recommended that the following regulations be incorporated into the standard rules and regulations for maternity homes to be established by the State Health Department:

1. Personnel. Maternity homes must be conducted by a respectable and experienced person, preferably a registered nurse.
2. Children under fifteen years of age shall not be permitted into patient quarters. This refers to children of the household and children of the visitors.
3. Equipment. There shall be sterilization facilities available in each maternity home for the sterilization of linens, instruments and bed pans. There shall be provided single beds for the individual patient and a bassinette or similar crib for each infant.
4. Permanent records and reports. There shall be kept in each maternity home permanent daily records for each patient. These records shall include the temperature and pulse, eating habits, elimination, condition of lochia on each individual patient. These permanent records shall be made available for authorized inspectors from the Department of Health. Further, these records shall apply to both the mother and the newborn, as far as practical. It

is further recommended that when these maternity homes are inspected for licensure that they shall be given from a nurse or a doctor specific information concerning special problems in their homes, such as sterilization of equipment, after-care of patient, and the care of the infant. It was further recommended that a manual of instruction be issued from the State Health Department to each maternity home.

Your committee recommends that obstetric and pediatric seminars for North Dakota physicians be resumed throughout the state, probably in early fall, and that picked personnel to establish these seminars be selected by the Maternal and Child Welfare Committee.

Your committee recommends that the anonymous case reports of maternal deaths, as supplied by investigators from the State Health Department, be referred to each individual member of this committee for consideration.

Incubators for prematures: It was suggested by Dr. Saxvik that incubators be bought and distributed by the State Department of Health throughout the state. Your committee felt that before definite action could be taken on this problem, information obtainable from the pediatric survey must be reviewed.

Definition of prematurity: Your committee recommends that the definition of a premature infant shall be any infant whose birth weight is 5½ pounds or less.

E.M.I.C. plan: Your committee favors discontinuation of the E.M.I.C. plan six months after the declaration of cessation of war has been made.

Immunization: Your committee authorized the preparation of a pamphlet by Dr. Pray and Dr. Dyson giving routine practices in immunizations. This pamphlet is to be sent to Mr. Engebretson, executive secretary of the North Dakota State Medical Association, for distribution to physicians in the state.

Poliomyelitis: A discussion of poliomyelitis in the state of North Dakota was held.

Rh Factor: It is again strongly recommended by your committee that as soon as possible routine Rh factor determinations be done on all premarital blood samples sent to the State Health Department laboratory. Further, it is advised that hospitals, while doing blood typing, shall at the same time make an Rh determination and, further, that no transfusion be done with blood groups or Rh factor of incompatible bloods. Lastly, it is recommended that all submitted prenatal bloods shall have a Wassermann and Rh factor determination.

State Department of Health records: Your committee believes that the Children's Bureau records on infant and maternal deaths should be forwarded directly to the hospitals for immediate action by the doctors concerned. The long delay now present in assembling the necessary data for these records greatly decreases their usefulness. It was felt that this survey of infant and maternal deaths should be continued for another year.

Rheumatic fever program: Your committee recommends that a rheumatic fever program be established in North Dakota and that the State Health Department should attempt to establish such a program. Dr. Freise was asked to investigate the possibility of obtaining financial aid for such a program from the American Legion or other unofficial, non-professional agencies and report his findings to the North Dakota State Medical Assoication in May, 1947.

JOHN H. MOORE, M.D., Chairman

Pneumonia

The Committee on Pneumonia held no formal meetings during the current year. Efforts were made earlier in the year to arrange a meeting with the North Dakota Department of Health but the office was then in the process of change. Since that time it has been impossible to find an available date for a meeting. The following are the state totals for the incidence of pneumonia, the place of treatment and kind of treatment.

Kind of Pneumonia:	
Lobar	382
Broncho	540
Other (not spec.)	90
Not stated	62
	1,074

Place of Treatment:	
Home	44
Hospital	833
Not stated	194
	1074

Type of Treatment:	
Sulfa	110
Penicillin	427
Combination of sulfa and penicillin	215
Combination of penicillin with serum	10
Combination of sulfa with serum	3
Other	3
No information	306

O. W. JOHNSON, M.D., Chairman

Medical Economics

In spite of continued prosperity and changes in party control of the federal congress, considerable agitation persists for further federal government participation in the field of health.

THE FEDERAL GOVERNMENTAL FIELD

Senator Robert A. Taft, chairman of the Republican legislative steering committee, is himself sponsoring two bills which may decidedly affect the practice of medicine.

The Fulbright-Taft bill (S-190) and the Aiken bill (S-712) are now receiving attention in committee hearings. Both of these bills would create a Department of Health, Education and Security of cabinet status. The difference between them lies in the degree of separation in function between Health, Education and Security matters. The Taft bill would provide for three undersecretaries—one for each field; while the Aiken measure would provide for but one undersecretary with the result that medicine would no doubt receive representation only in lower administrative positions.

The Taft-Ball-Smith bill (S-545) is currently the most far-reaching measure to be introduced thus far in the 80th session of Congress. It may seem strange that Title One of this bill provides, not for a department of cabinet status, but simply for an administrator of health responsible directly to the President. The measure requires that he be a doctor of medicine. Taft has explained that he believes that separate identity of things pertaining to health and medicine should be maintained.

Title Two is the most important part of the measure. It provides for a program of grants-in-aid to the various states for the payment of all medical costs for all those persons unable to pay either in whole or in part for medical care. The aid would be limited to those in need. No general withholding tax would be levied. The necessary federal monies would be appropriated from the general tax funds. The control of the expenditures of this money would be solely under the control of the various states subject to certain broad requirements.

In order for a state to qualify, it must submit a plan so designed to effect the medical care of all those in need within a period of five years. It must also assure the federal government that arrangements have been made so that the state will be able to stand half the cost of the program. Hearings are to begin on the measure as soon as the senate Labor and Welfare committee has finished with its labor legislation.

The new Wagner-Murray-Dingell bill has not as yet been introduced but its sponsor states that it will be soon. Meanwhile, various governmental agencies such as the FSA, the Bureau of Agricultural Economics, Office of Labor, the U. S. Public Health Service, and the Children's Bureau are campaigning strongly for government-controlled medicine. The new technique is by propaganda to attempt to build up a local or grass-roots demand for such measures.

ACTIVE IN NORTH DAKOTA

In North Dakota we have considerable of this left wing activity both on the part of governmental agencies and on the part of some local organizations. A common denominator which would seem to fit the goal of all those engaged in such activity is the power which would result from the control of so vast an undertaking.

Leaders of certain farm groups have been, and are, actively planning and trying to promote any change in the method of medical practice which will give them some control over the profession. They are using the phrase "consumer control" or "consumer controlled cooperative." This is an even more pernicious system than federal medicine. The same people also are supporting federal medical care probably with the thought that they will be able to exercise some measure of political influence in the operation of such a program. We would like to point out that an active propaganda campaign is being carried on, and that various well-meaning organizations are being unfavorably influenced by it. Our members should be active in their home communities in combating such plans.

A.M.A. ACTIVITIES

The American Medical Association is now quickly developing a strong and constructive program for improvement in distribution of medical care and its cost. Much of its efforts are being directed toward the goal of making sure that voluntary prepayment medical plans shall work. It is the job of the new Associated Medical Care Plans to guard the profession and the people from improperly conceived plans. This it does by endorsement after careful scrutiny. It also acts as a clearing house for the exchange of information between existing plans, and lends advice and counsel to plans in the formative period.

Its Bureau of Medical Economics, under Dr. Dickinson, is in the process of making valuable surveys.

Its Committee on Rural Medical Care, on which your secretary, Dr. L. W. Larson, sits as co-chairman, has been performing an outstanding service in working toward an understanding with rural people in connection with the very difficult problem of distribution of rural medical care.

We would call attention to the fact, however, that regardless of the amount of effort expended by the American Medical Assoication, your state association and other groups who are in sympathy with these principles for which they stand, no forward steps may be taken without the active cooperation of all individual physicians. The work to be effective must be supported by the doctor in his own community.

During the past year the chairman of this committee has attended three national meetings dealing with various phases of medical economics.

VOLUNTARY PRE-PAYMENT MEDICAL INSURANCE

Organized medicine is convinced that voluntary pre-payment medical insurance is the best answer to the problem of making the best possible quality of medical care available to all economic groups at the least possible cost. Those who actually cannot afford to pay the premium will, in the future as they have in the past, receive equally high quality care through a combination of charity services performed by physicians coupled with local and federal aid.

The Committee on Medical Economics, feeling that the North Dakota State Medical Association is now at the crossroads and must determine whether the voluntary pre-payment plan as it exists in Cass county should be expanded or whether a statewide commercial insurance program should be adopted, has again reviewed both of these programs.

Commercial insurance plans are in effect at present only in Wisconsin and South Dakota. Minnesota, however, is very seriously considering the same plan. The "plan" when reduced to basic characteristics involves little more than the endorsement of those companies who are willing to write without alteration a predetermined contract (South Dakota); or the endorsement of those companies who are willing to meet certain minimum standards in the writing of their contracts (Wisconsin).

Also investigated was the probable effect if legislation similar to the Taft Bill (S. 545) were passed in the future. This bill has received some medical support, because among other things it provides that the federal grants-in-aid may be used to pay premiums on policies of voluntary non-profit pre-payment medical insurance plans.

The physician controlled plan has now passed its formative stage and is in position to rapidly expand. At least 36 states have such plans in operation at present and all the rest are working on some sort of a program. For several years the committee made detailed investigation of the plans then operating in other states. It has submitted to the Association model enabling legislation which has become law in North Dakota and it submitted a detailed state plan which has been put into effect in Cass county.

The physicians of Cass county deserve a vote of appreciation for their vision and spirit of cooperation which enabled them to make an uncontestable success of this plan in its first year of operation. Credit must go too to the Blue Cross and its staff in Fargo for its very creditable record in enrolling approximately 6,500 persons in nine months. The plan is reported as financially sound and there has been no pro-ration of doctor's bills nor does there seem any future need for such action.

The Committee on Medical Economics recommends that the North Dakota State Medical Association associate themselves with and extend the North Dakota Physician's Service Plan as it is in effect in Cass county to the entire state, and that the office of the State Association proceed to enroll the physicians of this Association.

NEW SUB-COMMITTEES

For the past several years, the work of this committee has been seriously increasing due to the investigation and adoption of new programs touching on the field of medical economics which this state society and other state societies have felt wise to undertake. The fields of voluntary pre-payment medical insurance; rural medical care, and veterans medical service are becoming large individual programs. At the same time these three fields are decidedly interwoven and are a part of the larger concept embodied in the general field of medical economics.

For these reasons we recommend that a sub-committee of voluntary pre-payment medical insurance, a sub-committee of rural medical care, and a subcommittee of North Dakota veterans medical service be appointed to facilitate the investigation and operation of programs in these respective fields—such subcommittees to clear through the Committee on Medical Economics for correlation and for clarification of policy.

HEALTH COUNCIL

This committee has been observing for some time the need of some source to which local communities or individual citizens may turn for information regarding health problems. This feeling has been accentuated during the past year when sincere individuals from every section of the state traveled to Bismarck in quest of information relating to problems of hospital construction and were unable to obtain any substantial information. It is felt that the inter-allied professional groups can perform a valuable service to this state by making information they have at hand available.

This committee then recommends that the State Department of Health, the State Nurses Association, the State Dental Association, the State Hospital Association, the State Architectural Association, the State Pharmaceutical Association, the State Bankers Association, and such other groups or organizations as may be deemed proper, be invited to join the State Medical Association in such a council, and, that if sufficient number of those groups believe such a council to be feasible, that the same be organized.

OFFICE OF THE EXECUTIVE SECRETARY

The chairman of this committee wishes to take this opportunity to express his gratitude on behalf of himself and this committee for the aid extended by the office and staff of the executive secretary. The cooperative attitude of this office has greatly facilitated the work of this committee.

W. A. WRIGHT, M.D., Chairman

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In the absence of Dr. Wright, the secretary read a supplement to the report of the Committee on Medical Economics, which supplemental report, together with the report as contained in the handbook, was referred to the Reference Committee on the Report of the Committee on Medical Economics.

Your chairman submits the following as a supplementary report to the report of the Committee on Medical Economics.

The House of Delegates at its annual meeting in May, 1946, approved the contract and fee schedule which this committee then submitted concerning the arrangements with the Veterans Administration for the care of the veteran by the members of this Association.

Shortly thereafter the Minnesota State Medical Association gave notice that they had substantially revised the schedule which they proposed to submit, such revision being substantially upward. With the desire of uniformity for the states in this area, our fee schedule was re-written to conform more closely with the new Minnesota fees. The contract with this schedule attached was executed by Dr. L. W. Larson, chairman of the executive committee of the Council, as the Council had delegated these powers to the executive committee.

The Veterans Administration has now made a counter-proposal in which they have approved some of the fees as submitted by us and have set so-called "maximum fees" on those items which it refused to accept.

On April 12 your committee studied in detail the counter-proposal as made by the Veterans Administration and concluded that by and large, the fees as proposed by the Veterans Administration were reasonable and adequate. There were a number of fees, however, which the committee considered too low. After discussion, a price which was thought reasonable was substituted in lieu of the figure determined by the Veterans Administration. The committee concluded that, as amended, the schedule was both adequate and fair.

Since that time there have been requests from several of the states making up the North Central Conference to the effect that a meeting should be held in St. Paul today for the purpose of discussing the problem. Your chairman has felt that as the House of Delegates was to meet so soon and that as the North Central Conference meeting was proposed at the same time, that it would be best to withhold our own counter-proposal until: (1) the House of Delegates could have the opportunity of reviewing the schedule; and, (2) the North Central Conference could have the opportunity of expressing itself as to the problem.

Because of the above reasons it is recommended that:

> The fee schedule as submitted by the Veterans Administration with the amendments as recommended by your committee be approved and that it be the recommendation of this house that the Veterans Administration accept said amendments as being minimum fair fees.

Since the establishment of the Committee on Medical Economics as a standing committee, it has concerned itself, among other things, with the recommendation and establishment of fee schedules which from time to time became necessary in performing services for various governmental agencies, both state and federal. Because of this custom, this committee has from time to time undertaken the authority to make amendments to such schedules when emergencies arose at a time when the House of Delegates was not in session.

The fee schedule, if fair or if it can be made fair, must be negotiated as we have already undertaken this work and are rather substantially committed financially. There is no reason to feel confident that the schedule is in its exact final form as yet. The chances are that it will still require modification.

Because of the above reasons it is recommended that:

This House of Delegates do empower and delegate your Committee on Medical Economics with such power as may be necessary to compromise and negotiate a final agreement with the Veterans Administration after having considered the recommendations of the North Central Conference and all other facts pertinent to this agreement. And that this power be continuing throughout the life of this contract, subject to further action of the House of Delegates.

W. A. WRIGHT, M.D., Chairman

Venereal Disease

The Committee on Venereal Disease met on April 20, 1947, and Drs. Frank Darrow, C. J. Meredith, M. M. Heffron, R. O. Saxvik of the State Health Department, together with investigators F. M. Meyer and H. D. Neugebauer, were present. The Health Department reported the following statistics on syphilis:

	1944	1945	1946
Primary	34	29	97
Secondary	35	22	56
Early Latent	50	50	45
Late Latent	38	23	30
Congenital	20	11	4

This would indicate a marked increase in primary and secondary syphilis. The decrease is in the early latent and congenital. Dr. Saxvik presented the proposal of the Hospital Bed Program for syphilitics which is here included.

The Hospital Bed Program provides facilities through contracts with the hospitals in North Dakota at a fixed cost per patient day for infectious syphilis cases only. Infectious syphilis is considered to be any syphilis infection of less than four years' duration; or if date of onset is unknown, a syphilitic infection occurring in a white person less than thirty years of age or in a non-white person of less than twenty-five years, excluding latent cases who have received a complete course of rapid therapy or twenty arsenical and interim heavy metal. All persons residing in North Dakota are eligible regardless of income.

Federal aid for the Hospital Bed Program shall not exceed a sum equal to 70 per cent of the total cost of inpatient care for patients admitted under this plan. State aid for the Hospital Bed Program shall not exceed a sum equal to 30 per cent of the total cost which will be paid from the V.D. fund. The maximum cost per day will not exceed $7.50 per patient day. A separate contract is required with each hospital participating in the program. The State Health Department will keep a ledger containing date, hospital, physician, treatment, cost of hospitalization, amount of penicillin and other drugs used, number of hospital days and total cost which will not exceed $7.50 per patient day.

It is requested that uniform treatment schedules will be made by the Committee on Venereal Disease of the North Dakota State Medical Association to be used in the Hospital Bed Program. The State Health Department will recognize only these schedules formulated by this committee. Upon each admission to the hospital under this plan, the State Health Department will be notified on department forms as to the amount of penicillin, arsenicals and other drugs for immediate replacement. The physician will be paid by a personal fee from the patient, or a standard fee from the Chemical Control Plan through the patient, or by both the personal fee from the patient and the standard fee from the Chemical Control Plan. The contracts will contain a clause permitting the State Health Department to interview all persons admitted to the hospital under this plan to elicit contacts.

The hospital participating in this program will submit a statement containing the number of days according to the terms of the contract. The statements will be verified in the Venereal Disease section, vouchers prepared and submitted to the Business Office for payment.

* * * * *

After discussion, it was decided by the committee to recommend acceptance of this plan. It is necessary for the committee to recommend acceptance of types of early treatment to be used in connection with this hospital plan. After considerable discussion of some ten plans submitted, which are herein included, plans 4, 7 and 5 are recommended as acceptable.

PRIMARY AND SECONDARY

1. 4,800,000 units of penicillin in oil and beeswax for eight days. 600,000 units daily in one injection. Unusually satisfactory results.—RTC Bellevue Hospital, New York. Dr. E. W. Thomas.

2. 2,700,000 units of penicillin in oil and beeswax for nine days. 300,000 units daily, one injection of .06 Mapharsen every other day until five injections are given. One injection of bismuth in oil ($\frac{1}{2}$ cc.) on first, fifth, and ninth day. For patients over 10 years of age.—Mississippi RTC.

3. 3,000,000 units of penicillin in oil and beeswax for five days. 600,000 units daily in one injection.—RTC Collinger Hospital.

4. 5,000,000 units of penicillin for nine days. 16,667 units every two hours. Five arsenicals and three bismuth treatments.—U.S.P.H.S.—RTC.

5. 2,400,000 units of penicillin for nine days. 2,500 units every two hours. Five injections of bismuth.—Massachusetts RTC.

6. 1,200,000 units of penicillin for nine days. 16,667 units every three hours. Four injections of .06 Mapharsen, three injections of bismuth ($1\frac{1}{2}$ cc.).—J. R. Heller, Chief of V.D. Division.

7. Four injections of arsenicals in four consecutive days of .04 gram of each injection. On the fourth day penicillin therapy should be started with 40,000 units of penicillin in every three hours for $7\frac{1}{2}$ days for a total of 2,400,000. On last day of penicillin therapy bismuth is started in doses of $1\frac{1}{2}$ grs. Ten injections are given at the rate of one every fifth day.—A.M.A *Journal*, Dr. A. O'Leary, Rochester, Minnesota.

8. 2,400,000 units of penicillin for $7\frac{1}{2}$ days. 40,000 units every three hours for 60 doses.—U. S. Army, 1944-45.

CONGENITAL SYPHILIS

1. Total dose of 100,000 units per kilo of body weight in equally divided doses, intramuscularly every three hours for ten days.—A.M.A., Oct. 19, 1946.

2. 40,000 units per kilo body weight.

The plan for infants is also tentatively recommended as acceptable. There is, however, some controversy as to whether this amount is large enough or carried on for a long enough time. The committee recognizes that these treatments are all more or less tentative and may have to be changed as more complete information becomes available. It was also thought advisable that a plan be recommended for trial where intravenous injection was not feasible. This, of course, would be used on outpatients—600,000 units daily of penicillin in wax and oil for eight days (4,800,000 units). The committee also recommended that the State Department supply venal vacuum tubes for taking Wassermann tests, as there has been a distinct reduction in the number of Wassermanns taken since these have not been distributed.

Attention is called to information given us by the Health Department that the venereal disease program at the Garrison Dam project may become troublesome and dangerous not only for those at the site of the project but because of possible spread from that area. A cooperation of all doctors in carefully reporting cases will help the Health Department keep this under control. It is also suggested that in cases where there is no evidence of syphilis than a positive Wassermann to recommend this be repeated before treatment is instituted. This committee also feels that the society should recommend and approve of routine Wassermanns in prenatal cases.

Frank I. Darrow, M.D., Chairman

REPORTS OF SPECIAL COMMITTEES

The following reports of special committees were referred to the Reference Committee on the Report of the President, Secretary, and Special Committees.

Industrial Health

Again, your Committee on Industrial Health did not hold an official meeting during the past year.

The Council on Industrial Health in the American Medical Association is very active and has forwarded your chairman a voluminous amount of literature concerning their activities.

Your committee again voices their approval of the aims and purposes of the National Council and are desirous of cooperating with them in every way.

C. J. Glaspel, M.D., Chairman

Emergency Medical Service

During the past fiscal year there having been no emergencies arising, the Committee on Emergency Medical Service has not met, nor have they taken any committee action.

A. C. Fortney, M.D., Chairman

Nursing Education

During the past year, your Committee on Nursing Education has met twice. It is very much concerned with the present shortage of nurses and the low enrollment in schools of nursing.

In July your committee met in joint session with the State Board of Nurse Examiners and mutual problems were discussed at length. While nothing concrete was accomplished at this meeting, the attitude of the medical profession toward these problems was forcefully and frankly stated. The board proposed a compulsory Practical Nursing Bill at this time and your committee made it clear that there would be opposition to it within the ranks of medicine.

A later meeting was held in the fall to consider specifically a draft of a Practical Nursing Bill which the board indicated they would introduce in the legislature. This bill was so drafted that the board could have excluded from hospital employment all persons who performed acts in the care of the sick who had not met certain qualifications including a nine to twelve months training course. This the committee unalterably opposed.

In January the chairman met in Bismarck with the Committee on Public Policy and Legislation and at the twelfth hour the board revised their bill making licensure only voluntary. This will give the board the power to license such practical nursing training courses. It is apparent to your committee that there will have to be some change in the nurse's curriculum, probably following along the lines of a short course for training nurses in routine work and a longer course to provide supervisors. As the revised bill makes this experiment possible and at the same time does not make it possible to aggravate the present shortage by excluding the hospital auxiliary it was felt that the opposition should be withdrawn and the bill supported. The bill passed the legislature and has now become law.

It is felt by the committee that the desirable result was largely brought about by the frank exchange of thought between the committee and the State Board of Nurse Examiners and recommends that such exchange be sought on all mutual problems of importance.

G. W. Toomey, M.D., Chairman

Veterans Medical Service

The North Dakota Veterans Medical Service Division of the North Dakota State Medical Association opened its doors for business March 24, 1947. Several weeks earlier President Spear, at the suggestion of Dr. W. A. Wright and others, appointed this committee to be responsible for the administrative functions of this service.

Because of the short time which has elapsed since the program went into effect it is difficult to make any worthwhile appraisal of it. Another factor makes appraisal even more difficult. From March 24, 1947, to April 18, 1947, there were but 117 authorizations for examination or treatment issued by the Area Medical Office of the Veterans Administration located in Fargo. The reason given for this was that the Veterans Administration at the end of their third fiscal quarter had run out of appropriations. It therefore became necessary to obtain a deficiency appropriation from Congress and after that was accomplished to then allocate the new monies to the various Veterans Administration activities throughout the states. This was apparently accomplished by April 18th. From that date through April 30th the North Dakota Veterans Medical Service Division has partially processed 440 authorizations reflecting some ten or eleven thousand dollars in fees to be paid to North Dakota physicians when the work authorized is completed.

So far as can presently be determined the program is running very smoothly, which is the result of careful planning and the establishment of an efficient system and office procedure. Credit for this is due to Mr. R. H. Penwarden, who was appointed by the Council as director of the program.

Your committee does not hold formal meetings but is present and available for advice and aid to this division whenever it is found necessary.

While it is still too early to determine what, if any, modifications ought be adopted for purposes of efficiency, your committee wishes to make the following recommendations to the membership participating in this program:

It must be remembered that the true success of the program will depend on the careful and high quality work of the doctor and his cooperative attitude toward the program.

It is recommended that he become familiar with the booklet of Instructions and Information sent to him from the state office.

It is recommended that he become wholly familiar with the forms and exercise care in filling them out.

And, lastly, it is recommended that he return his reports as soon as reasonably convenient and not wait and send them to the North Dakota Veterans Medical Service Office in Bismarck in groups at the end of each month.

R. B. Radl, M.D., Chairman

Report of the Delegate to the American Medical Association

The 95th annual session of the House of Delegates of the American Medical Association was held in San Francisco July 1 to 5, 1946.

The registration of the Fellows of the American Medical Association at the San Francisco session totalled 7746. This number exceeded the previous session at San Francisco by more than a thousand.

A tremendous amount of routine business was transacted throughout the four-day session of the House of Delegates. Most important of all was the report to the House of Delegates by the Board of Trustees of the survey of the public relations of the American Medical Association in progress for the last six months. Unfortunately, this report had only shortly been received by the Board of Governors and a detailed report was to be made at the interim session, which will be held in Chicago in December. However, they did report a decision for the expansion of the Bureau of Medical Economics and the procurement of an outstanding economist to direct this bureau. Part of the functions of this economist will be the development of sound material in the field of medical economics for the *Journal* and also for *Hygeia*. They also established in the headquarters of the association a division for the interpretation of the activities of the various councils, bureaus and other agencies of the American Medical Association, to the medical profession and to the public. For this purpose they have selected an expert trained in the field of public relations.

There was also a decision made to expand the educational activities of the American Medical Association, with a view to informing the American people, during the centennial year, of the great accomplishments of American medicine during the last one hundred years.

There was also formed a Council on Medical Service; this replaces the Council on Medical Service and Public Relations. The specific purpose of this new council is to give every possible assistance to the development and promotion of pre-paid medical care plans.

Among the many resolutions that were offered to the House of Delegates were these significant ones:

1. A resolution urging the limitation of the constitution of the Health Organization of the United Nations to problems related only to preventive medicine, standardization of drugs and biologic preparations and the prevention of dissemination of disease between nations and asking that questions relating to the nature of medical practice in an individual nation be not considered a function of an international organization.
2. The House of Delegates again reaffirmed its point of view regarding the Wagner-Murray-Dingell bill and commended proposals for the extension of medical care which would not involve interference by government between doctor and patient.
3. A resolution to revise the constitution and by-laws of the association was approved.
4. The Judicial Council was asked to report on a revision of the principles of medical ethics.
5. A change in the by-laws was adopted, which provides for two sessions of the House of Delegates annually, the extra session to be held in December.

The scientific sections of the American Medical Association were well attended and a tremendous variety of subjects were discussed.

The session throughout was marked by harmony. The reference committees worked hard and long on their individual reports, which were presented in a manner that was most clarifying and which were generally well received without too much acrimonious debate.

The president-elect was Dr. Olin West who for many years has been secretary and general manager of the American Medical Association. A fine tribute to his long years of outstanding service was shown by the fact that there was no opposition to his candidacy and he was elected unanimously.

Your delegate also begs leave to report on the first interim session of the House of Delegates, which was held in Chicago at the headquarters of the American Medical Association on December 9 to 11, 1946.

As an evidence of the interest taken in the work of the American Medical Association, it should be noted that practically every delegate who is entitled to be present had registered for the meeting.

A great deal of time of this meeting centered on the report relative to the public relations of the association; in effect, a comprehensive review of the entire Rich report. A mimeographed copy of this report was placed in the hands of each delegate for study. Many of the suggestions in this report have already been put into effect. These activities include the preparation of a News Letter for county and state medical societies; releases of information to the press and radio; assistance in the preparation of pamphlets and brochures, and the general function of interpretation of the association and its work to the public.

A full day's time was taken up in the discussion of the revision of the constitution and by-laws, a full report of which will be given at the meeting in Atlantic City.

There was also considerable detailed discussion noting the continued progress in the development of pre-payment plans for medical costs.

A report of interest to your state association concerns the findings of the Committee on Rural Medical Service. This committee has labored long and hard in an effort to devise ways and means to further rural medical service. They propose to formulate working methods for: (1) bringing and holding well-qualified physicians in rural communities, (2) the development of hospital facilities and health centers, (3) the furtherance of voluntary pre-payment plans, (4) nursing needs of rural communities, (5) health councils and agencies for promoting rural health, (6) medical care for lower-income groups.

Your delegate was pleased to note that further study is being given to all of these important points, and there will no doubt be a further report on these topics at the Atlantic City session.

The meeting adjourned sine die at 12:30 o'clock P.M., on December 11, 1946.

A. P. Nachtwey, M.D.

The Medical Center Advisory Council

As representative of the North Dakota State Medical Association on the Medical Center Advisory Council, permit me to report that the stated meetings of the council were held according to law during 1946.

At a joint meeting of the Medical Center Advisory Council and the Board of Higher Education held on June 10, 1946, it was decided that a mill levy for the support of the North Dakota State Medical Center would be the most desirable and equitable way of raising funds for the support of this state-wide program. The Board of Higher Education pointed out that the financial support of the Medical Center should be set up in a budget separate and distinct, and in addition to those submitted for educational institutions under their control.

At the meeting of the council on October 29, 1946, the director was ordered to proceed with his plans for presentation of the matter to the legislature. This resolution which passed both houses of the legislature with little opposition, reads as follows:

30th Legislative Assembly of North Dakota
Senate Concurrent Resolution 12
Referred to Committee on State and Federal Government.
Introduced by Senators Stucke and Drew.

A concurrent resolution for the amendment of the Constitution of the State of North Dakota providing for a special levy of one mill upon all taxable property within the State of North Dakota to produce a fund for the North Dakota State Medical Center at the University of North Dakota.

Be It Resolved, by the Senate of the State of North Dakota, the House of Representatives concurring therein:

That the following amendment to the Constitution of the State of North Dakota is agreed to and shall be submitted to the qualified electors of North Dakota for approval or rejection at the general election to be held in November, 1948, in accordance with the provisions of Section 202 of the Constitution of the State of North Dakota as amended.

Section 1. Upon the adoption of this amendment to the Constitution of the State of North Dakota there shall be annually levied by the State of North Dakota one mill upon all of the taxable property within the State of North Dakota which, when collected, shall be covered into the state treasury of the State of North Dakota and placed to the credit of the North Dakota State Medical Center at the University of North Dakota; said fund shall be expended as the legislature shall direct for the development and maintenance necessary to the efficient operation of the said North Dakota State Medical Center.

Section 2. This amendment shall be self-executing, but legislation may be enacted to facilitate its operation.

* * * * *

It seems to your representative and to the other members of the Medical Center Advisory Council who have given this matter a good deal of thought and study, that this action is most desirable for it puts directly up to the vote of the people a project which is of vital interest to them. All of the participating agencies in the Medical Center Advisory Council through their authorized representatives have approved this plan. Should the constitutional amendment be adopted, it would assure adequate financial support for the center and enable it to carry out more effective work for the health of the people. I wish to call your attention to a resolution passed by the Committee on Education for the North Dakota State Medical Association, in its fall meeting in 1946.

"WHEREAS the North Dakota Medical Association has approved the North Dakota State Medical Center law, and

WHEREAS it has adopted the reports of its duly elected representative on the Medical Center Advisory Council, and

WHEREAS we, as the Committee on Education of the North Dakota Medical Association realize the critical shortage of doctors in the State of North Dakota and the necessity for training them in North Dakota as a protective health measure for our people,

NOW, BE IT RESOLVED, that the Committee on Education of the North Dakota Medical Association endorse the program of the Medical Center Advisory Council and urge its adoption in the next legislative assembly of the State of North Dakota.

FURTHERMORE, BE IT RESOLVED that copies of this resolution be sent to the Governor of the State of North Dakota, the members of the Budget Board, the members of the North Dakota Legislature and all physicians practicing in North Dakota, together with such supporting data as the Director of the Medical Center may indicate.

AND FINALLY, BE IT RESOLVED, that the Committee on Education of the North Dakota Medical Association recommend to the President of the University of North Dakota that a four year medical school be activated at the University of North Dakota as authorized by the Medical Center Law just as soon as faculty and finances permit."

* * * * *

The decentralizing features of the teaching program which contemplate the use of existing hospitals throughout the state in the teaching program, and the various physicians in North Dakota working in these hospitals as members of the medical school faculty, is in line with modern trends in medical education. It is the plan that has been so successfully followed in Wisconsin and is now being employed in Michigan. I recommend to the House of Delegates that it give its continued support to this program.

JOHN H. MOORE, M.D.

New Business

Dr. Waldschmidt, at the request of the Sixth District Medical Society, presented the following resolution, which was referred to the Committee on Resolutions:

WHEREAS, the schedule of the North Dakota Compensation Bureau Schedule of Medical Fees was adopted years ago, and

WHEREAS, the medical fees in general have risen because of increased living costs,

NOW, THEREFORE, BE IT RESOLVED, that the North Dakota State Medical Association respectfully urges the North Dakota Compensation Bureau to review its schedule of medical fees in order that those fees which are inadequate may be raised.

Nominating Committee

The speaker announced the appointment of the following members to the Nominating Committee: Dr. D. J. Halliday, Kenmare; Dr. O. A. Sedlak, Fargo, and Dr. P. H. Woutat, Grand Forks:

Adjournment

The First Session of the House of Delegates was adjourned to reconvene at 8:00 P.M., on the same day on motion of Dr. A. P. Nachtwey, seconded by Dr. R. H. Waldschmidt and carried.

SECOND SESSION OF THE HOUSE OF DELEGATES

Sunday Evening, May 25, 1947

The Second Session of the House of Delegates was called to order by the speaker, Dr. John Moore, at 8:30 P.M., in the South Room of the Gardner Hotel, Fargo, North Dakota, May 25, 1947. The secretary called the roll. Fifteen delegates responded and the speaker declared a quorum present. The following delegates were present: Drs. A. C. Fortney, Fargo; O. A. Sedlak, alternate, Fargo; G. W. Toomey, Devils Lake; P. H. Woutat, Grand Forks; F. E. Weed, Park River; J. D. Craven, Williston; A. R. Sorenson, Minot; D. J. Halliday, Kenmare; A. H. Reiswig, Wahpeton; P. T. Cook, Valley City; R. H. Waldschmidt, Bismarck; M. S. Jacobson, alternate, Elgin; V. D. Fergusson, Edgeley; A. P. Nachtwey, Dickinson; W. W. Wood, Jamestown; F. W. Ford, alternate, New Rockford.

The reading of the minutes of the First Session was dispensed with on motion by Dr. Ford which was seconded by Dr. Reiswig and carried.

Election of Officers

Dr. D. J. Halliday, chairman of the Nominating Committee, presented the following report. Speaker called for nominations from the floor. Hearing none he declared that a motion would be in order to declare the nominees duly elected to their respective offices. Dr. Halliday moved that the nominees be elected unanimously, which motion was seconded by Dr. Woutat and carried unanimously.

President—P. G. Arzt, Jamestown
President-elect—W. A. Liebeler, Grand Forks
First Vice President—W. A. Wright, Williston
Second Vice President—L. W. Larson, Bismarck
Treasurer—E. J. Larson, Jamestown
Secretary—O. A. Sedlak, Fargo
Speaker of House of Delegates—A. P. Nachtwey, Dickinson
Delegate to the A.M.A. in 1948—John H. Moore, Grand Forks
Alternate Delegate to A.M.A. in 1948—G. W. Toomey, Devils Lake
Councillors:
- First District—J. F. Hanna, Fargo
- Third District—C. J. Glaspel, Grafton
- Sixth District—R. H. Waldschmidt, Bismarck
- Ninth District—F. W. Ford, New Rockford (to complete the term of A. E. Westervelt, Bowdon)

Board of Medical Examiners:
- A. E. Spear, Dickinson
- Frank Weed, Park River
- W. A. Wright, Williston

Selection of 1948 Meeting Place

The secretary announced that a formal invitation had not been received. Dr. W. W. Wood stated: "I would like to invite the Association to meet in Jamestown next year. We will do our best to entertain you in the style in which you have been accustomed in the past." In moving the acceptance of this invitation Dr. A. R. Sorenson stated: "Minot is long overdue for this meeting but because of a lack of hotel facilities, we cannot invite the Association to Minot." The motion was seconded by Dr. Waldschmidt and carried.

REPORTS OF REFERENCE COMMITTEES

Reference Committee to Consider the Reports of the President, Secretary and Special Committees

Dr. G. W. Toomey, chairman, presented the following report which was adopted section by section and as a whole:

1. Report of the President. The report spontaneously reveals the enormous amount of time and thought which our president has expended in meeting with both professional and lay groups. The very efficient manner in which he has executed the duties of his office during such a trying period of social reforms and his apparent alertness to all phases of these problems should be highly commended.

We wish to call your special attention to the recommendations, suggesting enlargement of the Committee on Medical Economics, the establishment of a State Health Council composed of inter-allied professional groups, and the establishment of a state-wide voluntary prepayment medical insurance plan. Your committee recommends the adoption of this report.

2. Report of the Secretary. It is evident that in spite of his duties being lightened by the appointment of an executive secretary he has continued in his ceaseless efforts on behalf of the Association. We wish to congratulate him for the honor of being elected to the Council on Scientific Assembly of the American Medical Association, of which honor we are all proud.

It is gratifying to note the increase in paid memberships during 1947 over the previous three years, but we wish to emphasize the responsibility of the local societies regarding the several members in active practice who have failed to pay their current dues.

We wish to note that the employment of an executive secretary has been most profitable to the society and that our confidence in him has been justified. Your committee recommends the adoption of this report.

3. The Report of the Committee on Industrial Health.

4. The Report of the Committee on Emergency Medical Service.

5. Report of the Committee on Nursing Education. It may be emphasized that the establishment of two types of nursing curricula be recommended to the Board of Nursing Education,

namely, a short course to provide nurses for routine work, and a continuation of the present course to provide supervisors and specialists in certain nursing fields.

G. W. Toomey, M.D.
A. H. Reiswig, M.D.
H. A. LaFleur, M.D.

Reference Committee on Reports of the Council, Councillors and Delegate to the A.M.A.

Dr. P. T. Cook, chairman, presented the following report, which was adopted section by section and as a whole:

1. Report of Chairman of the Council. The Committee wishes to further emphasize that for non-resident members and for former members who have completely retired from practice and have become inactive, that these members be reminded by the secretaries of the various district societies that the dues have been established at $10.00

2. Report of the Councillors. Your Reference Committee has noted the fine reports of the various councillors and wishes especially to commend the Second District for sponsoring an essay contest.

3. Report of the Delegate to the American Medical Association. Your reference committee has reviewed the excellent and enlightening report of Dr. Nachtwey, delegate to the American Medical Association, and recommends the adoption of this report:

4. Report of the State Medical Association's Representative on the Medical Center Advisory Council. Your reference committee wishes to comment on the fine work of the Medical Center Advisory Council, and especially the work and diligence of Dr. John Moore, and we recommend the adoption of this report.

P. T. Cook, M.D.
C. C. Smith, M.D.
P. H. Woutat, M.D.

Reference Committee to Consider the Reports of Standing Committees

Dr. J. D. Craven, chairman, presented the following report, which is adopted or rejected, section by section, and as a whole:

1. Committee on Medical Education. Particular attention should be given to the report of the Committe on Medical Education concerning the medical center in which it is noted that there will be a proposal before the voters of the state to assess a mill levy, the returns of which form a fund to develop the Medical Center. It is suggested that the members of the State Association be aware of this and encourage its passage wherever possible.

It is recommend to the House of Delegates that they pass a resolution commending Dr. French for his efforts in behalf of a Medical Center.

2. Committee on Necrology and Medical History. Particular attention is directed to the large number of sixteen of our professional brothers who have died in the past year. It is with a feeling of deep regret that we note the passing of these pioneer physicians and we request the House to stand for a moment in silent respect to their memory.

(The chairman then asked the privilege of the floor for Dr. Williamson.) Dr. Williamson stated that two members of the Association had passed away since the report was made in the Handbook, and made the following report:

Dr. J. E. Hetherington, practitioner of Grand Forks. Died May 9th at the age of sixty-two. He was born in Larimore and after graduation practiced in Larimore for a number of years before moving to Grand Forks. Survivors are a brother, sister, daughter and grandson.

Dr. Harry Brandes, long-time practitioner of Bismarck. Died May 12th at the age of fifty-nine, at Bismarck. Graduated from Washington University. Came to North Dakota in 1914. Practiced in Hazen, North Dakota, prior to service in World War I. Located in Bismarck after the war. Served our State Association as president in 1939-40. Survivors are Mrs. Brandes, a son and a daughter.

The speaker then stated: "It seems that in adopting this report, which none of us care to adopt, I am sure we could violate parliamentary procedure and pass this by standing for a moment with bowed heads in tribute to the memory of these men." The assembly stood in silent tribute.

"You may be seated. It is with deep regret that I order the adoption of the report of the Committee on Necrology."

3. Committee on Public Health. "The report of the Committee on Public Health has been reviewed. The members of the House of Delegates should familiarize themselves with the resolutions reported by the committee, and we recommend the adoption of the report with the exception of Resolution No. 4. It is felt that in view of numerous reports of various nature now being required of the average physician and the time expended in getting out reports, we do not recommend the adoption of this resolution. We would like a discussion on this matter by the delegates." A discussion was held. The chairman then moved the adoption of this portion of the report with the deletion mentioned which was seconded and carried.

4. Committee on Public Policy and Legislation. Particularly noteworthy is the efficiency of their action in legislative matters and their vigilance in preventing the passage of undesirable bills relating to health policies in the state. For this they are highly complimented."

5. Committee on Tuberculosis. "Your reference committee recommends the adoption of the report of the Committee on Tuberculosis as printed in the Handbook and the supplementary report of this committee which was read at the First Session."

6. Committee on Official Publication. Your reference committee recommends the adoption of the report of the Committee on Official Publication.

7. Committee on Cancer. "The report of the Committee on Cancer has left some confusion in the minds of the reviewing committee as to the function of the 'Cancer Detection Clinic', to-wit (1) the method by which patients obtain services of the clinic, and (2) the function of the clinic if 'they do not diagnose or treat disease'. It is suggested that the chairman of the committee clarify these points in paragraph two of the report for the benefit of the delegates." Dr. L. W. Larson, chairman of the Committee on Cancer, then explained in some detail the manner in which cancer detection clinics would function, stating that these clinics were in the process of development and that they had been given the official approval of the House of Delegates of the American Medical Association. He pointed out that they must have the approval in each case of the local district medical society before being established in any location. He stated that the clinics do not diagnose or treat disease, but are established to detect abnormalities which do not give symptoms sufficient to send a patient to a doctor. If such symptoms are discovered, they are advised to go to their own private physician. If the patients are indigent they are sent to the proper agencies for the care of such patients. Upon further questioning Dr. Larson gave specific information as to how such a clinic would be established. He stressed the fact that it is the business of the medical profession to make every doctor a cancer detection clinic so that the doctor does look for cancer in the supposedly well person.

8. Committee on Maternal and Child Welfare. Your committee has reviewed the contents of this report and wishes to commend the committee on its work and thoroughness.

9. Committee on Venereal Disease: After reviewing the report of the Committee on Venereal Disease, it is recommended that the "Hospital Bed Program for Syphilis" be discussed before the House of Delegates. Dr. Darrow explained that the committee had compiled a list of treatments which would be acceptable to the Venereal Disease Committee and the State Health Department, that the program is merely another public health measure to make sure that infectious cases of syphilis are receiving adequate treatment to stop the spread of syphilis. Upon the explanation of the chairman, it was moved, seconded and carried that this portion of the report be adopted.

10. Committee on Fractures. Your reference committee recommends the adoption of the report of the Committee on Fractures.

11. Committee on Pneumonia. Your reference committee recommends the adoption of the report of the Committee on Pneumonia.

J. D. Craven, M.D.
A. R. Sorenson, M.D.
A. C. Fortney, M.D.

Reference Committee Report on Committee on Medical Economics

Dr. A. P. Nachtwey, chairman, presented the following report which was adopted or rejected, section by section and as a whole:

1. Problems in Federal Government Field. Your committee deems it advisable that inasmuch as the executive secretary of the State Medical Association will be advised as to the status of these bills and will then contact the executive committee or the secretaries of the component societies as to what action is advisable, that any resolution on these bills be deferred.

2. Problems in North Dakota. Your committee heartily endorses the suggestion of the Committee on Medical Economics that these plans should be combatted by an active interest which should be shown by each individual doctor.

3. Activities of the American Medical Association. Your reference committee takes pleasure in endorsing this section of the report. Upon a request from Dr. A. R. Sorenson as to information of the activities of the Committee on Rural Medical Care, Dr. L. W. Larson, member of the Committee on Rural Medical Care of the American Medical Association, discussed the activities of that committee in some detail. He stated that the purpose of this committee is to see what may be done to improve rural medical care. He listed some of the deficiencies which have been charged. He stated: "This committee had to find out whether or not these things are true and if they are to do something about it and, if not true, to find some way to combat that propaganda." He explained that the committee had held two general meetings at which time various farm organizations such as the Grange, Farmers Union, Farm Bureau, and the National Cooperative Association were invited to send delegates as an advisory committee to the committee on Rural Medical Care. He stated that it was his belief and the feeling of the American Medical Association that much can be accomplished in these open and frank discussions in the way of obtaining cooperation of the lay groups.

4. Voluntary Prepayment Medical Insurance. The chairman in reporting the recommendation of the reference committee in connection with voluntary pre-payment insurance pointed out that the report of the Committee on Medical Economics did recommend the extension throughout North Dakota of the North Dakota Physicians Service plan *as it is in effect* in Cass county. He reported that the reference committee believed such a recommendation to be too binding on the other component societies. He pointed out that the Cass County plan restricted its coverage to surgical, fracture and obstetrical services performed in a *hospital* and that the plan would not allow a doctor to be paid for any work done in his office, such as tonsillectomies, minor operations, confinements in the home or maternity hospitals. He pointed out that this would work a hardship on the rural doctor and inasmuch as it is the goal of the Association to supply rural communities with doctors, the Cass County plan in detail should not be made mandatory upon the other district medical societies. Dr. Nachtwey stated that the reference committee was in agreement that some plan ought to be adopted as soon as a practical and an agreeable plan could be reached and stated during the discussion that all efforts should be made toward this end; that the reference committee also provided for such action in a later section of this report by the recommendation of the appointment of a sub-committee on Voluntary Pre-payment Insurance, such committee to devote its entire time toward the arrival at an acceptable plan.

5. New Sub-Committees. The reference committee is entirely in accord with the recommendation establishing three new subcommittees to the Committee on Medical Economics. First, a Committee on Pre-Payment Medical Insurance, which committee will be charged with the further investigation of the voluntary pre-payment insurance field. Second, a Sub-Committee on Rural Health, which committee will be charged with investigation of all the factors relating to the rendition of medical services and health matters in general in rural communities. Third, the Sub-Committee on North Dakota Veterans Medical Service, which committee will be charged as an operating committee with the functioning of the North Dakota Veterans Medical Service Division, a division of the North Dakota State Medical Association.

6. Inter-Allied Professional Council. Chairman Nachtwey explained that the reference committee considered the recommendation of the establishment of this council, described in the report of the Committee on Medical Economics as a *Health Council*, as being a duplication of other existing bodies. He pointed out that the State Health Department is headed by a Health Council and that there is an advisory committee charged with advising said council. It was pointed out during the discussion on this question that the health council proposed by this recommendation would be more of an inter-allied professional group, organized for the purpose of agreeing on basic policies and for the dissemination of information to North Dakota citizens. On the motion of Dr. Sorenson, seconded by Dr. Fortney, this matter in the Medical Economics report dealing with the Health Council was re-referred to the reference committee for further consideration.

7. Supplementary Report of the Committee on Medical Economics. This supplementary report has to do with the delegation of such power to the Committee on Medical Economics which would permit said committee to negotiate fee schedules with the Veterans Administration in connection with the Home Town Plan care for veterans. The reference committee chairman announced that the committee recommend that this supplementary report be referred to the Council for action.

A. P. Nachtwey, M.D., Chairman
F. E. Weed, M.D.
R. H. Waldschmidt, M.D.
W. W. Wood, M.D.
J. R. Dillard, M.D.
V. D. Fergusson, M.D.
D. J. Halliday, M.D.

Reference Committee on Resolutions

Dr. F. W. Ford, chairman, presented the following report which was adopted section by section and as a whole:

1. Your reference committee recommends the adoption of the resolution having to do with negotiation of fee schedules with the Workmen's Compensation Bureau.

2. Your reference committee wishes to present the following resolution:

Whereas, the North Dakota State Medical Association has been opposed to the principle of compulsory medical insurance because such insurance will be detrimental to the welfare of the public,

And Whereas, the Wagner-Murray-Dingell Bill recently introduced is a form of compulsory medical insurance,

Now, Therefore, Be It Resolved, that the North Dakota State Medical Association in regular session in Fargo, North Dakota, on May 25, 1947, reaffirms its opposition to the principle of compulsory medical insurance.

Be It Further Resolved, that a copy of this resolution be forwarded to the chairman of the appropriate committees of the United States Senate and House of Representatives.

3. Your reference committee wishes to present the following resolution:

Whereas, that owing to the shortage of nursing supervisors in the hospitals of North Dakota, and owing to the shortage of nurses in North Dakota in the training schools throughout the state,

Be It Therefore Resolved, that the House of Delegates recommend that the North Dakota State Board of Nurses Examiners, or any responsible nursing licensing agency training schools for nurses in North Dakota be requested to recognize and accredit with suitable professional recognition the status of nursing supervisors who are trained in various medical, surgical and obstetrical specialties in postgraduate nursing by North Dakota accredited hospitals by North Dakota physicians.

4. Your Committee on Resolutions wishes to present the following resolution:

Whereas, the 60th annual meeting of the North Dakota State Medical Association held in Fargo promises to be outstanding from the standpoint of scientific programs offered and the entertainment features,

Now, Therefore, Be It Resolved, that the House of Delegates offer its thanks to the Cass County Medical Society and its local committees, city of Fargo, and the Elks Club of Fargo, for the contributions they have made toward the success of this meeting.

F. W. Ford, M.D., Chairman
J. D. Craven, M.D.
A. H. Reiswig, M.D.

Unfinished Business

The speaker declared it was now in order to consider the proposed revisions of the by-laws which were given their first reading in the First Session of the House of Delegates. Inasmuch as these proposed amendments were moved by Secretary Larson as part of the secretary's report, G. W. Toomey, chairman of the Reference Committee to Consider the Reports of the President, Secretary and the Special Committees, presented the following report:

Your committee approves the amendments to the constitution and by-laws of Chapter VII, Section 5, and Chapter VIII, Section 2, as proposed in the secretary's report, and read at the First Session. It also recommends the adoption of the amendment to Chapter VIII, Section 1, with a revision as follows:

Amendment, Chapter VIII, Section 1. The Committee on Scientific Program shall consist of the president and the secretary of the State Association, and three members appointed by the president of the local society from the membership of the local society where the annual meeting is to be held. The committee shall hold its first meeting on or before the second Tuesday in December, at which time it shall consider all suggested speakers for the scientific program, submitted by the members of this Association. The committee shall select at least 25 per cent of the speakers on the scientific program from members of the Association, if practicable, and if there are not sufficient suggested local speakers to meet this quota, the committee shall be authorized to request presentation of such papers from individuals who are members. It shall determine the character and scope of the scientific proceedings of the society, subject to the instructions of the House of Delegates, or to the provisions of the Constitution and By-Laws. Thirty days previous to each annual session it shall prepare and issue a program announcing the order in which papers, discussions and other business shall be presented, which shall be adhered to by the society as nearly as is practicable.

This report was moved by Dr. Waldschmidt, seconded by Dr. Woutat, and carried.

The speaker then announced that the House of Delegates would be declared adjourned until 11:30 P.M. for the purpose of permitting the reference committee to consider the report of the Committee on Medical Economics, so that they might reconsider their action regarding the Health Council recommended in that report.

THIRD SESSION OF HOUSE OF DELEGATES

Sunday Evening, May 25, 1947

The Third Session of the House of Delegates was called to order by the speaker, John Moore, at 11:45 P.M., in the South room of the Gardner Hotel, Fargo, North Dakota, May 25, 1947. A quorum was declared present. The reading of the minutes of the Second Session was dispensed with.

Reference Committee Report on Report of Committee on Medical Economics

Dr. A. P. Nachtwey, chairman, presented the following report which was adopted:

This reference committee desires to rescind its action on its previous recommendation, and desires to recommend the formation of an Inter-Allied Professional Council, this council to consist of representatives of the State Department of Health, State Nurses Association, the State Dental Association, the State Hospital Association, the State Architectural Association, the State Pharmaceutical Association, the State Bankers Association, and such other groups or organizations that may be deemed proper. And this council be activated by the secretary of the State Medical Association.

A. P. Nachtwey, M.D., Chairman
F. E. Weed, M.D.
R. H. Waldschmidt, M.D.
W. W. Wood, M.D.
J. R. Dillard, M.D.
V. D. Fergusson, M.D.
D. J. Halliday, M.D.

New Business

Dr. O. A. Sedlak moved that the North Dakota State Medical Association give endorsement to the objectives of the Association of American Physicians and Surgeons. Dr. H. B. Huntley, state delegate of the American Physicians and Surgeons, was called upon to explain the activities of this group. After a very able explanation of the objectives and aims of this organization and upon seconding the motion by Dr. Fergusson, the motion was carried.

Dr. Frank I. Darrow explained that the American Legion is planning to aid the returned veteran by establishing in every Legion post a medical counsellor. Such medical counsellor would act without pay and simply in an advisory or counselling capacity to veterans needing medical advice. Dr. Darrow urged all physicians who are approached with a request to act in this capacity to accept the responsibilities involved in this public service plan.

Adjournment

The House of Delegates adjourned *sine die* at 12:35 A.M.

Scientific Program

Monday, May 26, 1947. Ball Room, Elks Club.

9:00-9:45 A.M.—Registration. View exhibits.

9:50-10:00—Welcoming Address—The Honorable C. A. Dawson, Mayor, city of Fargo.

10:00-10:45—*The Therapy of Common External Diseases of the Eyes*—E. P. Burch, St. Paul, Minnesota.

10:45-11:00—Intermission. View exhibits.

11:00-11:45—*The Roentgenologic Contribution to the Diagnosis of Non-Neoplastic Disease of the Intestinal Tract*—Harry Weber, Section on Roentgenology, Mayo Clinic, Rochester, Minnesota.

2:00-2:45 P.M.—*The Physiological Characteristics of Uterine Cancer in Relation to Radiation Therapy*—James F. Nolan, Washington University, St. Louis, Missouri.

2:45-3:00—Intermission. View exhibits.

3:00-3:45—*The Clinical Use of Antibiotics with Special Reference to Penicillin and Streptomycin*—Wallace E. Herrell, Clinical Section, Mayo Clinic, Rochester, Minnesota.

3:45-4:00—Intermission. View exhibits.

4:00-4:45—*Chemotherapy in the Treatment of Syphilis, Including Penicillin*—Paul A. O'Leary, Section on Dermatology, Mayo Clinic, Rochester, Minnesota.

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Tuesday, May 27, 1947. Ball Room, Elks Club.

9:00-9:45 A.M.—View exhibits.

9:45-10:30—*Diagnosis and Treatment of Acute Vascular Occlusion of the Extremities*—N. W. Barker, Clinical Section, Mayo Clinic, Rochester, Minnesota.

10:30-10:45—Intermission. View exhibits.

10:45-11:30 — *Peripheral Vascular Disease and the General Practitioner*—H. O. McPheeters, Minneapolis, Minnesota.

11:30-12:15 — *Common Errors in Proctologic Diagnosis and Treatment*—W. A. Fansler, Minneapolis, Minnesota.

2:00-2:30 P.M.—Presidential Address—A. E. Spear, President, North Dakota State Medical Association, Dickinson, N. D.

2:30-2:45—Installation of Incoming President.

2:45-3:15—*Cardiac Emergencies and Their Treatment*—Moses Barron, Minneapolis, Minnesota.

3:15-3:45—Intermission. View exhibits.

3:45-4:30—*Differential Diagnosis and Treatment of Abdominal Pain in Infants and Children*—Oswald S. Wyatt, Minneapolis, Minnesota.

Installation of President

Dr. Spear: It is with a great deal of pleasure that I appoint an honorary escort to accompany Dr. Arzt, incoming president, to the platform. Dr. Fred Wicks of Valley City, and Dr. James Hanna of Fargo are the last two additions to the long list of distinguished past presidents. By the very fine job they did before me, they made my task much easier and my burden much lighter. Now I ask Dr. Wicks and Dr. Hanna to escort Dr. Philip Arzt to the platform. (Dr. Arzt escorted to the platform.)

Dr. Spear: And now, Dr. Arzt, may I congratulate you. This is a well-deserved honor. I am confident of your success. I now present you with this gavel, the symbol of your authority. I admonish you, use it sparingly, but effectively. It is now your baby. You cannot enjoy it more, but I hope you enjoy it as much as I have.

Officers and members of the North Dakota State Medical Association, may I have the pleasure and privilege of presenting Dr. Philip Arzt, your president.

Dr. Philip G. Arzt: Mr. President, Members of the Association, and Visitors: It is difficult to put into words the gratification I feel at this moment. It is not so much the honor—which in itself is great indeed—that touches me, but the trust you have placed in me, at a time when the practice of medicine is again at the crossroad of history. I shall do my best to carry forward the same high standards initiated by Dr. Spear, the Council, House of Delegates, the various committees, and those who have labored so ably before them.

I realize that with a position such as this come responsibilities which might well be fearsome, were it not for the knowledge that you have always cooperated so freely and wholeheartedly as members of the organization, and the various committees with your president and the executive secretary, a most efficient officer. I shall probably lean heavily on him during the year.

I shall not attempt to mention by name those who have contributed so freely of their time, effort and ability, during the past year. The list would be too long and the remarks of commendation too empty. I do not believe that they were induced to high effort by the desire to be paid the "lip service" of "well done." Rather they contributed because as they saw it, there were problems to be met and work to be done. Their satisfaction will come when their ideas and conclusions, if thought proper by this democratic group, are accepted, and their work bears fruit. In respect to their efforts, such reports and recommendations made by them, should at all times receive most careful consideration. At no time should there be obstruction for the mere sake of obstructing, or refusal because of failure of the membership to enlighten itself on the problems involved.

I cannot pass this opportunity of singling out one man from our group for personal tribute. This man, a year ago, indicated by his remarks a genuine interest in what North Dakota people in general were attempting to accomplish toward the solution of health problems through the North Dakota State Health Planning Committee. Through his most genial way of dealing with people from all walks of life, his deep understanding of medical and social problems and his leadership ability, he has almost single-handed kept those who are in too much of a hurry on a stable course. In all other matters pertaining to his office he has given an inordinate amount of time and service. This is the most enviable record of your president, Dr. Spear.

It is with mixed feeling of emotions and a good deal of hesitancy that I venture to make a few remarks to you regarding the future of this organization. As an organization grows over a long period of years, there may be a tendency on the part of those who live in the present to feel that never before have the problems to be faced been as difficult. We certainly felt that way some years ago when we first were faced with an expanding United States Public Health Department. Later the Social Security System confronted us with the problem of working out details relating to Unemployment Compensation and Public Welfare Board problems. Certainly this was true when we were met with the problem of the FMAC, the FERA, and the Emergency Maternal and Infant Care program. And most lately we have felt that probably no one has ever been faced with a problem of as serious a nature as that which threatens us under the guise of National Compulsory Health Insurance. Each time as we met and disposed of the problem as best we could, I believe we had somewhat of the feeling that at last we've become of age. Thus it will always be. We may very well regret it, but the good old days, when the Association was almost exclusively a vehicle of fellowship and scientific edification, have passed forever.

And so, once again I am tempted toward the feeling that we have become of age, even though I realize deep down within me that this feeling will prove to be an illusion. The point is this: There will always be problems and we may choose to meet them and grapple with them or we may choose to sit back and refuse to become involved. We must always remember, however, that if we choose the latter alternative, and, by doing so, lose the medical heritage that we prize so dearly, we shall have to blame ourselves before we can, with conscience, blame others.

We are not free from our latest threat—that of National Compulsory Health Insurance. We are not free, because, although we are making sincere efforts to meet the underlying causes which gave rise to its conception, we have not as yet sufficiently solved the problem. We may indeed be thankful that a change in the composition of our Congress has given us more time to seek the proper solutions, and once having found them, to put the remedies into practical effect. That the forces advocating socialized medicine are now somewhat relegated to the background does not mean that they are dead. They are simply dormant. None of us can tell when, due to perhaps adverse economic conditions the advocates of a system of medicine adopted from socialistic and totalitarian European governments may be in a position to strike again—and with telling force. We should use this breathing period with the utmost of our effort to the end of strengthening our position so that when the blow is struck again we shall be in a better position to repel the attack.

It is not my function, to my notion, as incoming president, to advocate what solutions this Association ought to adopt at this time. This decision is for the appropriate committees and will finally be made by the House of Delegates and Council. It is my function, however, to call upon the organization for study, for investigation, and for action.

As I see it, the function of the medical profession in our society is to provide adequate medical care of high standards within the economic reach of the bulk of our people. The profession itself must be the judge of the standard and adequacy of care. No other group is equipped with the knowledge and experience to determine these points. The situation is somewhat different when it comes to the determination of what constitutes provision of such care within the economic capacity of the public. Here the people are insisting on a right to participate in the decision and, whether we wish it or not, probably will have the ultimate dominant voice.

Let us be realistic then. Both nation-wide and in North Dakota, doctors are convinced, and with good reason, that governmental medicine will not produce medical care of as high a standard as our people now enjoy. Neither will it accomplish a myriad of other things claimed for it by its proponents.

The answer then is to accept a position of leadership in helping the people to shape their decision as to what is the best possible solution in order to meet the problems of making available such care within the economic capacity of the public. If we sit back and allow the forces of opposition to shape the decision, we shall be sorry. If we succeed in shaping it ourselves, as indeed we can, provided we attain sufficient unity within our profession, we can sit back for a short moment and reflect on the notion that "at last we have become of age."

So, consequently, as I assume these new duties, there is no uncertainty, no hesitancy, no uneasiness. I know the members of this Association are a unit, are backing their officers, are all well-informed and know the score. You and I know the central office is efficient and willing to cooperate. So, all pulling as a team we can positively overcome any and all threats against the public health.

President's Address

A. E. Spear, M.D.

Dickinson, North Dakota

Mr. Chairman, officers and members of the North Dakota State Medical Association, and Friends:

Greetings and welcome to all of you to this, the Sixtieth Annual Meeting of our Association. There has been the largest registration this year of any year heretofore.

This is just one of those things which, as a time-honored custom, I have to do and you have to endure.

On behalf of the members and guests, I wish to extend to the Cass County Medical Society and the city of Fargo, our congratulations and sincere thanks for their efficiency in arranging this fine program for our instruction and entertainment.

For me, this has been a grand and glorious year, made possible by the fine group of men which makes up our Association. The work and inconveniences mean nothing in comparison to the pleasure of meeting and forming friendships with the many physicians of the state, nothing in comparison to the satisfaction in their words of confidence and encouragement. I have many times during the year called upon various members for assistance; often at great inconvenience and sacrifice. These members have always given their fullest cooperation. For this, I wish at this time to express my sincere appreciation.

There have been many changes in the nature of the Association over a period of the last few years. Whereas in the good old days it was more or less a social organization, it has lately been obliged to turn more and more to the business aspect of the practice of medicine. As medical economics became more important, and our business obligations increased, it became apparent that we needed a man who would give his full time to managing the affairs of the Association, and the need for an executive secretary was unquestionable. We were very fortunate in obtaining the services of Mr. E. F. Engebretson for this position. He has contributed very largely to the success of the Association during the year. His insight and rapid grasp of the situation have been remarkable. Having been raised in Fargo, and having practiced law in Bismarck before entering the service, he has a wide and valuable acquaintance over the state. This wide acquaintance, and his knowledge of the practice of law was a great help in handling the legislative situation, while his executive ability has been a big advantage in streamlining our organization, and making it a going concern. All who have had occasion to work with Mr. Engebretson will agree with me that he has done a fine job.

Last January at their mid-winter meeting in Bismarck, the Council authorized the organization of a Woman's Auxiliary of the North Dakota State Medical Association. I am very much in favor of such action and think it will be of advantage to our Association. There is a great deal of loose talk going around which is, to say the least, detrimental to the best interests of the medical profession. This is frequently heard at ladies' aid societies, P.T.A. meetings, clubs or other women's organizations, in many of which our wives hold membership. This talk is often put out casually by someone who knows little or nothing about the subject. If nothing is said in refutation, many listeners may carry away a false impression. This could be avoided if a well-informed wife of a doctor could tell her side of the story.

It is important that our wives and families, as well as our patients, should have a thorough understanding of the principles involved and dangers of socialized medicine, so that they are able to discuss it, point out its dangers and uphold and defend the profession. Moreover, these wives are our political equals, and probably could have more influence politically than their doctor husbands.

The scarcity of nurses presents a problem serious to the physicians, hospitals and the general public. The situation is the more alarming because it is certain to become worse before it gets better. While the supply is diminishing, the demand is increasing. There are many reasons for this condition. The Veterans Administration requires the services of thousands of nurses, and industry and public health require many more. Demands for hospital service are greater than ever before due to the country's prosperity, and shortening of the work week requires increased nursing personnel. Another factor is the ease with which high school graduates obtain satisfactory employment with little or no special training, often at better pay than is given a well-trained nurse.

The Practical Nurses Bill, which was passed by the last legislature was the result of cooperation on the part of the hospital, nurses and medical associations. It provides for the training and registration of practical nurses after nine months to a year of preparation. It is hoped that this law will help improve conditions in North Dakota. I believe that continued cooperation on the part of the hospitals, nurses and physicians can improve the nursing situation, and I hope that no doctor will ever miss an opportunity to encourage capable girls to take up this work.

In January of last year the Cass County Medical Society decided to offer the residents of Cass county a voluntary prepayment plan. Dr. Wright and his committee on medical economics had already done a great deal of work on prepayment plans, but it took the faith and fortitude of the pioneers for the Cass county doctors to make this decision, and for it great credit is due them. The success of the plan more than justifies their faith.

The Cass County Society chose the service plan and not the cash indemnity plan. They have not gone into the insurance business, but are making their professional services available on a voluntary prepayment basis to all the people of the county.

I would like to see this plan made available to all the people of our state at the earliest possible time. I believe it is one of our best methods to combat socialized medicine. I also believe it should be made available to all the indigent of the state through the welfare board at either a state or county level.

In this connection, it is interesting to note that an agreement has been made, effective last May 1st, between the North Dakota Hospital Association and the North Dakota Public Welfare Board for hospital care needed by recipients of public assistance. (North Dakota Welfare News and Views, April, 1947). It seems to me this is a step in the right direction.

A contract between the State Medical Association and the Veterans Administration was recently signed. Our Association is proud to be permitted to assume its share of the responsibility of assuring the veteran who has given so much in the service of his country, that he will be given the care he deserves. According to this plan, the veteran has free choice of doctor, providing the doctor chosen is equipped to perform the required services. The Medical Association has set up an administrative office in Bismarck to handle physicians' reports and payments of fees for which they are allowed a percentage to cover the estimated cost of administration. The plan has been in operation for about six weeks very successfully. Mr. Richard Penwarden is in charge and has proved himself very efficient and capable. The Veterans Administration has been very helpful and cooperative and, we understand, is very well satisfied. All we need to assure the complete success of this program is the full cooperation of every participating physician in the state.

The change in the complexion of the legislature after the recent election provided the medical profession a little recess in their fight against "socialized medicine;" but believe me it is only a recess. This is no time for complacency or relaxation, but rather a time to make plans and preparation for carrying on the battle.

Literally a horde of federal social and welfare workers are spending millions of dollars of the taxpayers' money to make the public think that the private practice of medicine has failed. These agencies continue to grind out propaganda for nationalized medicine and an unsuspecting public has become saturated with it.

Do not think that these propagandists are not well-organized, clever, and well-supplied with money (at the taxpayers' expense). The Bureau of Research and Statistics of the Social Security Administration, whose work is to gather and interpret statistics and put out propaganda is headed by one Isadore S. Falk. He has asked that his staff of 70 be increased to 80 in 1948. This does not look like the battle is over. For these miscellaneous services an appropriation of $3,756,500 for 1948 has been asked, an increase over this year's appropriation of one million dollars. This does not look like the battle is over.

Mr. Falk is not only smart and clever, but will stoop to anything to gain his objectives. He can twist statistics to prove anything he wants proved. As chief of health studies, he employs one Barkov S. Sanders, an Armenian statistician, who because of difficulties with the English language, grammar and diction, had to be bolstered by an editor-writer at a salary of $8000.00 a year. This Sanders is one of the federal officials who prepares statements in regard to health needs and programs for the American people.

Being protected by their "civil service status" these workers are beyond control of either Democrats or Republicans, and can carry on their evil efforts to enslave the public with impunity. Having neither principle nor party they can work in or through any party.

It is evident that the battle has just begun. I have recently been informed that a new Wagner-Murray-Dingell Bill is about ready to be presented. It is said to be less objectionable than any of its predecessors, and therefore probably more dangerous, because it might have more chance of being passed. If once passed, in most any form, it will be an entering wedge, and there will be little defense against eventual regimentation of American physicians and patients.

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

The organizational meeting of the Woman's Auxiliary to the North Dakota State Medical Association was preceded by a luncheon at the El Zagal Club House, Fargo, North Dakota, May 26, 1947.

Mrs. G. A. Larson, Fargo, chairman in charge of local arrangements, welcomed the women to Fargo and introduced Dr. A. E. Spear, Dickinson, president of the North Dakota State Medical Association. Dr. Spear made the following address of welcome to the women:

"Madame Chairman, our distinguished guest from Kansas, Ladies:

This is an honor and a privilege—an honor which I do not deserve and a privilege which makes me very, very happy. I am glad to see so many present, I am glad to see all showing such interest, and I am glad to be here myself.

I have heard people rave about the beauties of Colorado, I have heard people rave about the beauties of California. I prefer the beauties of North Dakota, but I did not expect to see so many here this afternoon.

On behalf of the North Dakota State Medical Association I extend to you all a most cordial welcome.

Last January, at their mid-winter meeting in Bismarck, the Council, at my suggestion, authorized the organization of a Woman's Auxiliary. I am very much in favor of this move, and believe it will be of mutual advantage to the Association and the ladies concerned.

There is a great deal of loose talk going around, which is, to say the least, detrimental to the best interests of the medical profession. This is frequently heard at ladies' aid societies, P.T.A. meetings, clubs, or other ladies' organizations, in many of which you yourselves hold membership. This talk may be purposeful, but often it is put out casually by someone who knows little or nothing about the subject. If nothing is said in refutation, many listeners may carry away a false impression. This could be easily avoided if a well informed wife of a doctor could tell her side of the story.

It is important that the doctors' wives and families should have a thorough understanding of the principles involved, and the dangers of socialized medicine, so that they are able to discuss it, point out its dangers, and uphold and defend the profession.

These annual meetings and the meetings of local societies would afford an opportunity to become informed on these subjects, and informative literature could be distributed to the members.

We are very fortunate and happy to have with us today, the vice president of the Woman's Auxiliary to the American Medical Association. She is also official organizer for this district, and has traveled from Kansas to help us get a good start. I have had some correspondence (strictly on this subject, you understand) with Mrs. Schaefer, but never met her until yesterday. She is a very charming lady and an excellent organizer. It gives me great pleasure to introduce Mrs. Leo J. Schaefer of Salina, Kansas, who will now take charge and proceed to direct you in the formation of a Woman's Auxiliary to the North Dakota State Medical Association."

Mrs. Leo J. Schaefer, Salina, Kansas, organization chairman of the North Central Region of the Woman's Auxiliary to the American Medical Association, then gave the following address:

"It is a real pleasure to be here in North Dakota. As organization chairman of the North Central Region, I have had North Dakota and her possible Auxiliary on my mind day and night. When the children are in school and I am home alone doing the numerous household duties, I plan my Auxiliary work. Of course, 'Queen for a Day' keeps me with the lunch dishes, but after that Auxiliary plans take precedence. The North Central Region is composed of twelve northern states beginning with Nebraska and ending with Ohio. North Dakota was the only state in that region not organized. I was very pleased to have the privilege of discussing an Auxiliary with your president, Dr. Spear. I think I fully realize the problem confronting an Auxiliary as the states of North and South Dakota, Nebraska, Kansas, Iowa and parts of Missouri all have similar problems—mainly widely-separated areas with only a few doctors. They, in turn, have little time for many medical meetings. Personally I realize an Auxiliary in such states is as much and maybe of more value than in highly populated areas for the reason that leadership is recognized and ideas are tarnsmitted more rapidly. We live a slower pace.

The question is asked why an Auxiliary, and what can we accomplish? In the Constitution of the Woman's Auxiliary to the American Medical Association, there are five objects listed.

1. To extend the aims of the medical profession to all organizations which look to the advancement of health and health education.
2. To cultivate friendly relations and promote mutual understanding among physicians' families.
3. To participate in any endeavor on the request of your Medical Society.
4. To coordinate and advise concerning the activities of county Auxiliaries.
5. To assist in the entertainment at all conventions of the State Medical Societies.

Let us return for a few minutes to No. 1: *Object of the Auxiliary*—to extend the aims of the medical profession to all organizations which look to the advancement of health and health education. Here the Auxiliary is divided (1) program which applies to informative material presented at Auxiliary meetings (2) public relations. In program material we must be informed on present-day things affecting the medical profession, such as

1. Unfavorable legislation
2. Blue Cross plan
3. Ten point program of the A.M.A. (It urges a minimum standard of nutrition, housing, clothing and recreation as fundamentals in a health program. It also deals with preventive medical services, maternal and child care, health and diagnostic centers and hospitals, medical and hospital care to veterans, medical research, etc.)
4. Child Health education especially in the schools
5. Rural health problems
6. Animal experimentation
7. Juvenile delinquency
8. Cancer control (American Cancer Society)
9. *Hygeia*
10. Bulletin
11. A.M.A. radio broadcasts.

The above list would provide program material for many meetings. It is well to have a member of the Medical Society to present this material and in turn use the material as study club material so you will be familiar with it.

Public relations. By public relations, we mean the interpretation of the medical profession to the public. This we can do having. 1. Pubilc relation teas. Health programs or Health days. 2. By providing authentic medical speakeds for organizations such as P.T.A., church, civic groups.

Dr. Shoulders, A.M.A. president, stated that it is necessary for the Woman's Auxiliary to know the philosophy of the A.M.A. It is also necessary for you to present the medical point of view when the occasion arises to the women's organizations to which you belong. Our purpose is welfare and progress under freedom. There can be no welfare worthy of the name when freedom is destroyed.

To summarize the No. 1 object of the Auxiliary—namely, to extend the aims of the medical profession to all organizations which look to the advancement of health and health education—it means that as an auxiliary group we should inform ourselves and in turn we as a group should assist with a public relations program and as individuals be responsible for authentic health information being distributed.

The other objects of the Auxiliary are self-explanatory: (2) friendliness, (3) assist local Medical Society, (4) to assist and advise county auxiliaries, (5) convention entertainment. I read in the January 1947 Journal-Lancet the summary of the North Dakota conference on 'Our Hospital and Health Needs.' It was a splendid summary.

Each woman's task as an Auxiliary member is of fundamental importance but she can get results only if she cooperates with all the other members.

Over the radio I heard this definition for success: 'When everyone else walks, you run.' An Auxiliary group with a well-planned educational program and with the members infiltrated in other women's groups, are 'running', not 'walking'. Perfection consists not in doing extraordinary things, but in doing ordinary things extra well. Let us adopt the pledge of the Woman's Auxiliary to the American Medical Association: I pledge loyalty and devotion to the Woman's Auxiliary to the American Medical Association. I will support its activities, protect its reputation, and ever sustain its high ideals."

The address was followed by an explanation by Mrs. Schaefer of the procedural organization of the association from the national headquarters down through the local district societies. Mrs. Schaefer advised that a committee of three members of the State Medical Association would be appointed by the president to act as an advisory council to the Woman's Auxiliary. The woman's organization will be set up exactly as the State Medical Association is set up, with officers consisting of the president, president-elect, first vice president, second vice president, recording secretary, corresponding secretary, treasurer, and ten councillors.

The following officers and councillors were then elected:

President: Mrs. P. G. Arzt, Jamestown
President-elect: Mrs. W. F. Baillie, Fargo
First Vice President: Mrs. H. M. Berg, Bismarck
Second Vice President: Mrs. Ted Keller, Rugby
Treasurer: Mrs. V. G. Borland, Fargo
Recording Secretary: Mrs. O. M. Smith, Killdeer
Corresponding Secretary (appointed by president): Mrs. John Jansonious, Jamestown
Councillors, terms expiring 1948:
  Fourth District—Mrs. A. D. McCannel, Minot
  Fifth District—Mrs. W. H. Gilsdorf, Valley City
  Ninth District—Mrs. F. W. Ford, New Rockford
Terms expiring 1949:
  Second District—Mrs. J. H. Mahoney, Devils Lake
  Seventh District—Mrs. E. J. Larson, Jamestown
  Eighth District—Mrs. V. D. Fergusson, Edgeley
  Tenth District—Mrs. R. W. Rodgers, Dickinson
Terms expiring 1950:
  First District—Mrs. R. D. Weible, Fargo
  Third District—Mrs. A. A. Kjelland, Hatton
  Sixth District—Mrs. R. H. Breslin, Mandan

Several smaller meetings were held on May 27 at which time Mrs. Schaefer further instructed elected officers and councillors as to the organizational aspects of the Woman's Auxiliary.

A banquet was held Tuesday evening, May 27, in the Colonial Room of the Gardner Hotel, with 69 women present.

North Dakota State Medical Association Roster - 1947

MEMBERSHIP BY DISTRICTS

CASS COUNTY MEDICAL SOCIETY

Dillard, J. R., Pres.	Fargo
Bond, J. H., Sec.	Fargo
Bacheller, S. C.	Enderlin
Baillie, W. F.	Fargo
Bakke, H.	Lisbon
Bond, J. H.	Fargo
Borland, V. G.	Fargo
Burt, A. C.	Fargo
Burton, P. H.	Fargo
Clark, I. D., Jr.	Casselton
Darner, C. B.	Fargo
Darrow, F. I.	Fargo
Darrow, K. E.	Fargo
DeCesare, F. A.	Fargo
Dillard, J. R.	Fargo
Elofson, C. E.	Fargo
Fjelde, J. H.	Fargo
Fortin, H. J.	Fargo
Fortney, A. C.	Fargo
Foster, G. C.	Fargo
Gronvold, F. O.	Fargo
Hanna, J. F.	Fargo
Haugrud, E. M.	Fargo
Hawn, H. W.	Fargo
Heilman, C. O.	Fargo
Hendrickson, G.	Enderlin
Hewes, F. L.	Fargo
Hunter, G. W.	Fargo
Huntley, H. B.	Kindred
Ivers, G. U.	Fargo
Joistad, A. H.	Fargo
Klein, A. L.	Fargo
Lancaster, W. E. G.	Fargo
Larson, G. A.	Fargo
Lewis, T. H.	Fargo
Long, W. H.	Fargo
Mazur, B. A.	Fargo
Miller, H. W.	Casselton
Morris, A. C.	Fargo
Nichols, A. A.	Fargo
Nichols, W. C.	Fargo
Oftedal, Trygve	Fargo
Ostfield, J. R.	Fargo
Patterson, T. C.	Lisbon
Pray, L. G.	Fargo
Richter, E. H.	Hunter
Sedlak, O. A.	Fargo
Stafne, W. A.	Fargo
Swanson, J. C.	Fargo
Tainter, Rolfe	Fargo
Tronnes, Nels	Fargo
Urenn, B. M.	Fargo
Weible, R. D.	Fargo

DEVILS LAKE MEDICAL SOCIETY

Palmer, D. W., Pres.	Cando
Fawcett, D. W., Sec.	Devils Lake
Call, A. M.	Rugby
Engesather, J. A. D.	Brocket
Fawcett, D. W.	Devils Lake
Fawcett, J. C.	Devils Lake
Fox, W. R.	Rugby
Gerber, L. S.	Lakota
Graham, J. D.	Devils Lake
Horsman, A. T.	Devils Lake
Hughes, B. J.	Rolla
Johnson, C. G.	Rugby
Keller, E. T.	Rugby
MacDonald, J. A.	Cando
Mahoney, J. H.	Devils Lake
Palmer, D. W.	Cando
Ruud, John E.	Devils Lake
Sihler, W. F.	Devils Lake
Smith, Clinton	Devils Lake
Toomey, G. W.	Devils Lake

GRAND FORKS MEDICAL SOCIETY

Dailey, W. C., Pres.	Grand Forks
Canterbury, E. A., Sec.	Grand Forks
Alger, L. J.	Grand Forks
Bartle, J. P.	Langdon
Benson, T. Q.	Grand Forks
Benwell, H. D.	Grand Forks
Boynton, B	Ada, Minn.
Brown, B. E.	Grand Forks
Brown, G. F.	Grand Forks
Burrows, F. N.	Bathgate
Campbell, R. D.	Grand Forks
Canterbury, E. A.	Grand Forks
Caveny, K. P.	Langdon
Countryman, G. L.	Grafton
Countryman, J. E.	Arch Cape, Ore.
Dailey, W. C.	Grand Forks
Deason, F. W.	Grafton
Field, A. B.	Forest River
Flaten, A. N.	Edinburg
French, H. E.	Grand Forks
Fritzell, K. E.	Grand Forks
Glaspel, C. J.	Grafton
Goehl, R. O.	Grand Forks
Graham, C. M.	Grand Forks
Grinnell, E. L.	Grand Forks
Hardy, N. A.	Minto
Haugen, C. O.	Larimore
Haunz, E. A.	Grand Forks
Hubler, W. L.	Grand Forks
Jensen, A. F.	Grand Forks
LaMont, J. G.	Grafton
Landry, L. H.	Walhalla
Leigh, R. E.	Grand Forks
Liebeler, W. A.	Grand Forks
Lohrbauer, L. T.	Grand Forks
Lommen, C. E.	Fordville
Mahowald, R. E.	Grand Forks
Moore, J. H.	Grand Forks
Mulligan, V. A.	Langdon
Muus, J. Meyer	McVille
Muus, O. H.	Grand Forks
Panek, A. F.	Milton
Peake, F. Margaret	Grand Forks
Quale, V. S.	Grand Forks
Rand, C. C.	Grafton
Ruud, H. O.	Grand Forks
Ruud, M. B.	Grand Forks
Silverman, Louis	Grand Forks
St. Clair, R. T.	Northwood
Stratte, Joseph J.	Grand Forks
Thorgrimson, G. G.	Grand Forks
Tompkins, C. R.	Grafton
Vance, R. W.	Grand Forks
Waldren, G. R.	Cavalier
Waldren, H. M., Jr.	Drayton
Weed, F. E.	Park River
Welch, W. F.	Larimore
Williamson, G. M.	Grand Forks
Withertsine, W. H.	Grand Forks
Woutat, P. H.	Grand Forks
Youngs, N. A.	Grand Forks

KOTANA MEDICAL SOCIETY

Jones, C. S., Pres.	Williston
Johnson, A. K., Sec.	Williston
AbPlanalp, I. S.	Williston
Craven, J. D.	Williston
Craven, J. P.	Williston
Hagan, E. J.	Williston
Johnson, A. K.	Williston
Johnson, P. O. C.	Watford City
Jones, C. S.	Williston
Korwin, J. H.	Williston
Lund, C. M.	Williston
McPhail, C. O.	Crosby
Porter, C. B.	Crosby
Skovholt, H. T.	Williston
Wright, W. A.	Williston

NORTHWEST DISTRICT MEDICAL SOCIETY

Erenfeld, F. R., Pres	Minot
Fischer, V. J., Sec.	Minot
Ball, Wm. J.	Minot
Beck, Charles	Harvey
Blatherwick, Robert	Parshall
Blatherwick, W. E.	Sanish
Breslich, P. J.	Minot
Cameron, A. L.	Minot
Carr, A.	Minot
Combs, A. B.	Minot
Conroy, M. P.	Minot
Craise, O. S.	Towner
Devine, J. L. Sr.	Minot
Devine, J. L., Jr.	Minot
Dyson, R. E.	Minot
Erenfeld, F. R.	Minot
Fischer, V. J.	Minot
Flath, M. G.	Stanley
Gammell, R. T.	Kenmare
Garrison, M. W.	Minot
Goodman, Robert	Powers Lake
Halliday, D. J.	Kenmare
Halverson, C. H.	Minot
Halverson, H. L.	Minot
Hammargren, A. F.	Harvey
Hanson, G. C.	Minot
Ingals, C. L.	Minot
Johnson, H. P.	Minot
Johnson, O. W.	Rugby
Kermott, Henry	Minot
Kermott, L. H.	Minot
Kernwein, G. A.	Minot
Knudson, K. O.	Glenburn
Kositsky, A.	Drake
Lampert, M. T.	Minot
Malvey, Kenneth	Bottineau
McCannel, A. D.	Minot
McCannel, M. A.	Minot
McGauvran, T. E.	Minot
McIntosh, H. A.	Kenmare
Nelson, L. F.	Bottineau
Neve, H. E.	Rolette
O'Neill, R. T.	Minot
Ransom, E. M.	Minot
Ray, R. H.	Garrison
Rowe, P. H.	Minot
Seiffert, G. S.	Minot
Sorenson, A. R.	Minot
Sorenson, Rodger	Minot
Spomer, J. P.	Minot
Timm, J. F.	Makoti
Wall, W. W.	Minot
Wallbank, W. L.	Dunseith
Wheelon, F. E.	Minot
Woodhull, R. B.	Minot

RICHLAND COUNTY MEDICAL SOCIETY

Kellogg, I. W., Pres.	Fairmount
Reiswig, A. H., Sec.	Wahpeton
Bateman, C. V.	Wahpeton
Beithon, E. J.	Wahpeton
Irvine, V. S.	Lidgerwood
Kellogg, I. W.	Fairmount
Miller, H. H.	Wahpeton
Reiswig, A. H.	Wahpeton
Thompson, A. M.	Wahpeton
Veitch, Abner	Lisbon
Wasemiller, E. R.	Wahpeton

SHEYENEE VALLEY MEDICAL SOCIETY

Gilsdorf, W. H., Pres.	Valley City
Meredith, C. J., Sec.	Valley City
Almklov, L.	Cooperstown
Christianson, Gunder	Valley City
Cook, P. T.	Valley City
Gilsdorf, W. H.	Valley City
Macdonald, A. C.	Valley City
Macdonald, A. W.	Valley City
Meredith, C. J.	Valley City
Merrett, J. P.	Valley City
Van Houten, J.	Valley City
Wesley, K. F.	Cooperstown
Wicks, F. L.	Valley City

SIXTH DISTRICT MEDICAL SOCIETY

Baumgartner, C. J., Pres.	Bismarck
Buckingham, T. W., Sec.	Bismarck
Arneson, C. A.	Bismarck
Baer, DeWitt	Steele
Baumgartner, C. J.	Bismarck
Benson, O. T.	Hollywood, Calif.
Berg, H. M.	Bismarck
Bertheau, H. J.	Linton
Bixby, Harriet	Bismarck
Bodenstab, W. H.	Bismarck
Boerth, E. H.	Bismarck
Brandt, A. M.	Bismarck
Breslin, R. H.	Mandan
Brink, N. O.	Bismarck
Buckingham, T. W.	Bismarck
Constans, G. M.	Bismarck
DeMoully, O. M.	Flasher
Diven, W. L.	Bismarck
Driver, D. R.	St. Paul
Fredricks, L. H.	Bismarck
Freise, P. W.	Bismarck
Gaebe, O. C.	New Salem
Griebenow, F. F.	Bismarck
Grorud, A. C.	Bismarck
Heffron, M. M.	Bismarck
Heinzeroth, George	Turtle Lake
Henderson, R. W.	Bismarck
Hetzler, A. E.	Mandan
Hill, F. J.	Minneapolis
Jacobson, M. S.	Elgin
LaRose, V. J.	Bismarck
Larson, L. W.	Bismarck
Lipp, G. R.	Bismarck
Monteith, George	Hazelton
Moyer, L. B.	Bismarck
Nuessle, R. F.	Bismarck
Orr, A. C.	Bismarck
Owens, P. L.	Bismarck
Perrin, E. D.	Bismarck
Peters, Clifford	Bismarck
Pierce, W. B.	Bismarck
Quain, F. D.	Bismarck
Radl, R. B.	Bismarck
Ramstad, N. O.	Bismarck
Roan, M. W.	Bismarck
Rosenberger, H. P.	Bismarck
Salomone, E.	Elgin
Schoregge, C. W.	Bismarck
Smith, C. C.	Mandan
Smith, W. M.	Olean, N. Y.
Soules, Mary	New England
Spielman, George	Mandan
Thompson, Arnold	Bismarck
Vinje, E. G.	Hazen
Vinje, R. X.	Beulah
Vonnegut, F. F.	Linton
Waldschmidt, R. H.	Bismarck
Weyrens, P. J.	Hebron
Wheeler, H. A.	Mandan

SOUTHERN DISTRICT MEDICAL SOCIETY

Wolfe, F. E., Pres.	Oakes
Meunier, H. J., Sec.	Oakes
Fergusson, F. W.	Kulm
Fergusson, V. D.	Edgeley
Lynde, Roy	Ellendale
Meunier, H. J.	Oakes
Van Houten, R. W.	Oakes
Wolfe, F. E.	Oakes

SOUTHWESTERN DISTRICT MEDICAL SOCIETY

Guloien, H. E., Pres.	Dickinson
Reichert, H. L., Sec.	Dickinson
Bowen, J. W.	Dickinson
Chernausek, S.	Dickinson
Dach, J. L.	Hettinger
Dukart, C. R.	Richardton
Dukart, Ralph	Richardton
Gilsdorf, A. R.	Dickinson
Guloien, H. E.	Dickinson
Gumper, A. J.	Dickinson
Hill, S. W.	Regent
Lyons, M. W.	Minneapolis
Maercklein, O. C.	Mott
Murray, K. M.	Scranton
Nachtwey, A. P.	Dickinson
Olesky, E.	Mott
Reichert, H. L.	Dickinson
Rodgers, R. W.	Dickinson
Schumacher, N. W.	Hettinger
Schumacher, Wm.	Hettinger
Smith, O. M.	Killdeer
Spear, A. E.	Dickinson
Vogl, Charles	Bowman

STUTSMAN COUNTY MEDICAL SOCIETY

Larson, E. J., Pres.	Jamestown
Nierling, R. D., Sec.	Jamestown
Arends, A. L.	Jamestown
Arzt, P. G.	Jamestown
Carpenter, G. S.	Jamestown
Cuthbert, W. H.	Jamestown
DePuy, J. L.	Jamestown
Elsworth, J. N.	Jamestown
Fisher, A. M.	Jamestown
Gerrish, W. A.	Jamestown
Holt, G. H.	Jamestown
Larson, E. J.	Jamestown
Nierling, R. D.	Jamestown
Sorkness, Joseph	Jamestown
Stokes, G. P.	Streeter
Wood, W. W.	Jamestown
Woodward, F. O.	Jamestown

TRAILL-STEELE MEDICAL SOCIETY

Cable, Thos. M., Pres.	Hillsboro
Vinje, Syver, Sec.	Hillsboro
Cable, Thos. M.	Hillsboro
Cleary, H. G.	Sharon
Dekker, O. D.	Finley
Kjelland, A. A.	Hatton
Knutson, O. A.	Buxton
LaFleur, H. A.	Mayville
Little, R. C.	Mayville
Savre, M. T.	Northwood
Stratte, John J.	Page
Vinje, Syver	Hillsboro

TRI-COUNTY MEDICAL SOCIETY

Boyum, P. A., Pres.	Harvey
Seibel, L. J., Sec.	Harvey
Boyum, P. A.	Harvey
Donker, A. E.	Carrington
Ford, F. W.	New Rockford
Gilliland, R. F.	Carrington
Matthaei, D. W.	Fessenden
Moore, M. J.	Naperville, Ill.
Schwinghamer, E. J.	New Rockford
Seibel, L. J.	Harvey
Voglewede, William	Carrington
Westervelt, A. E.	Bowdon

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AbPlanalp, I. S.	Williston
Alger, L. J.	Grand Forks
Almklov, L.	Cooperstown
Arends, Archabald L.	Jamestown
Arneson, Charles A.	Bismarck
Arzt, Philip G.	Jamestown
Bacheller, S. C.	Enderlin
Baer, DeWitt	Steele
Baillie, W. F.	Fargo
Bakke, H.	Lisbon
Ball, Wm. J.	Minot
Bartle, J. P.	Langdon
Bateman, C. V.	Wahpeton
Baumgartner, Carl	Bismarck
Beck, Charles	Harvey
Beithon, E. J.	Wahpeton
Benson, O. T.	Hollywood, Calif.
Benson, T. Q.	Grand Forks
Benwell, H. D.	Grand Forks
Berg, H. M.	Bismarck
Bertheau, H. J.	Linton
Bixby, Harriet	Bismarck
Blatherwick, Robert	Parshall
Blatherwick, W. F.	Sanish
Bodenstab, W. H.	Bismarck
Boerth, E. H.	Bismarck
Bond, J. H.	Fargo
Borland, V. G.	Fargo
Bowen, J. W.	Dickinson
Boynton, B.	Ada, Minn.
Boyum, P. A.	Harvey
Brandt, A. M.	Bismarck
Breslich, P. J.	Minot
Breslin, R. H.	Mandan
Brink, N. O.	Bismarck
Brown, B. E.	Grand Forks
Brown, G. F.	Grand Forks
Buckingham, T. W.	Bismarck
Burrows, F. N. (Hon.)	Bathgate
Burt, A. C.	Fargo
Burton, P. H.	Fargo
Cable, T. M.	Hillsboro
Call, A. M.	Rugby
Cameron, A. L.	Minot
Campbell, R. D.	Grand Forks
Canterbury, E. A.	Grand Forks
Carpenter, G. S.	Jamestown
Carr, A. (Hon.)	Minot
Caveny, K. P.	Langdon
Chernausek, S.	Dickinson
Christianson, Gunder	Valley City
Clark, I. D., Jr.	Casselton
Cleary, H. G.	Sharon
Cook, P. T.	Valley City
Combs, A. B.	Minot
Conroy, M. P.	Minot
Constans, G. M.	Bismarck
Countryman, G. L.	Grafton
Countryman, J. E. (Hon.)	Grafton
Craise, O. S.	Towner
Craven, J. D.	Williston
Craven, J. P.	Williston
Cuthbert, W. H.	Jamestown
Dach, J. L.	Hettinger
Dailey, W. C.	Grand Forks
Darner, C. B.	Fargo
Darrow, F. I.	Fargo
Darrow, K. E.	Fargo
Deason, F. W.	Grafton
DeCesare, F. A.	Fargo
Dekker, O. D.	Finley
DeMoully, O. M.	Flasher
DePuy, J. L.	Jamestown
Devine, J. L. Sr.	Minot
Devine, J. L., Jr.	Minot
Dillard, J. R.	Fargo
Diven, W. L.	Bismarck
Donker, A. E.	Carrington
Driver, D. R.	St. Paul
Dukart, C. R.	Richardton
Dukart, Ralph	Richardton
Dyson, R. E.	Minot
Elofson, C. E.	Fargo
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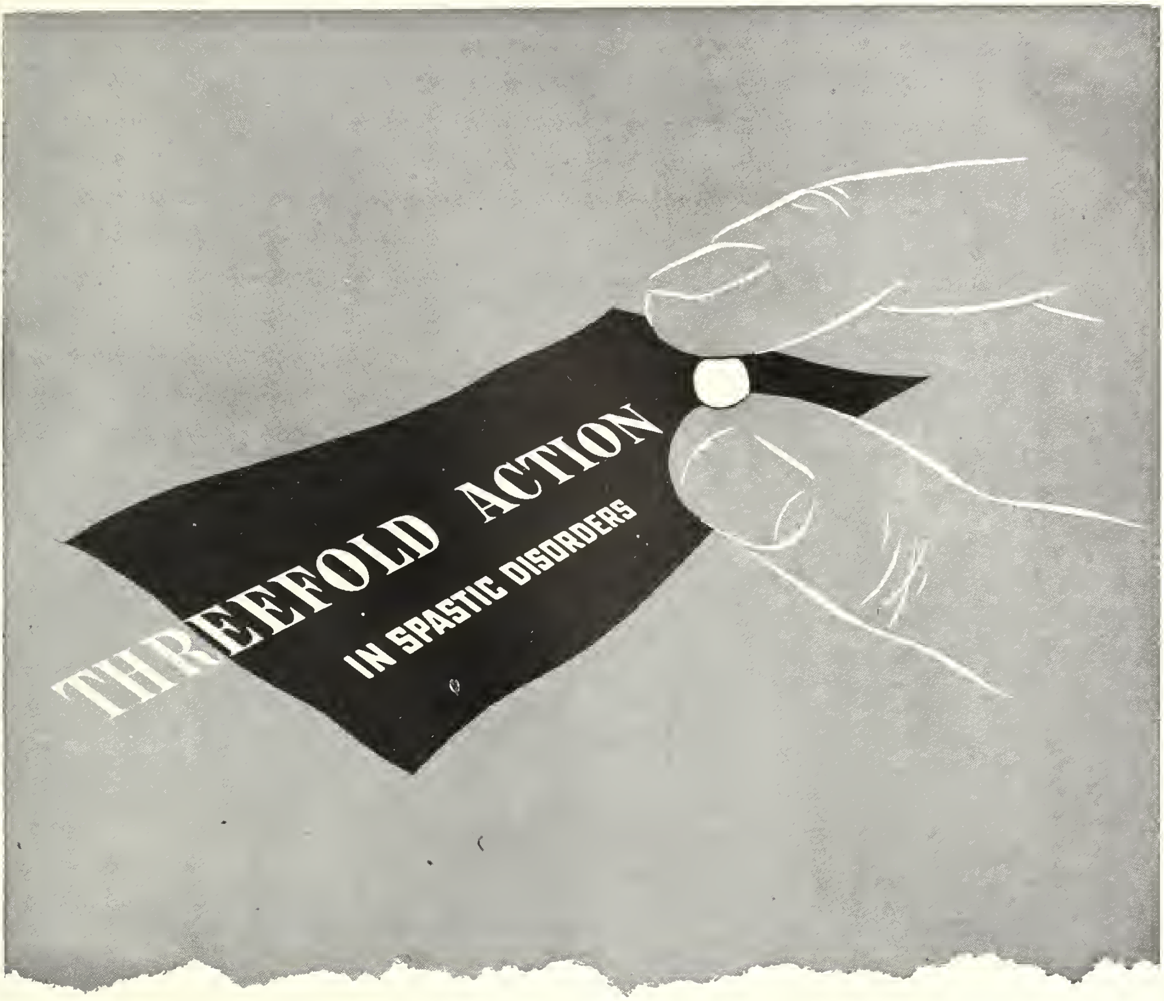

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Book Reviews

War Neuroses, by ROY R. GRINKER and JOHN P. SPIEGEL. Philadelphia: Blakiston Company, 1945; 145 pp.; $2.75.

- - - - - - - -

In this book on war neuroses the authors have done an excellent job in analyzing and grouping the various psychiatric syndromes seen during the war and have presented them in a simple, understandable form. Throughout this work the authors emphasize, and rightly so, that the war neuroses are not new clinical entities but represent an expression of the individual's personality make-up when exposed to the severe stress of war.

The authors have included in this book a fine discussion of certain general criteria that may be used in establishing a prognosis in these mental disturbances as well as an excellent summary of treatment. Of particular interest in the latter is the description of the recently popularized therapy of narcosynthesis.

This book comprises one of the most concise, clearly written volumes in the field of psychiatry. The material discussed is illustrated by well selected case reports. Although the subject matter is limited to war experiences, still the basic principles of classification, prognosis, treatment, and dynamics can easily be transposed into the milder stresses of civilian life. As such, this book assumes tremendous value as a psychiatric guide and can be most highly recommended not only for the psychiatrist but to the entire medical profession which inevitably must be exposed to similar clinical syndromes in every-day practice.

A. B.

The Clinical Application of the Rorschach Test, by RUTH BOCHNER and FLORENCE HALPERN, second edition. New York: Grune and Stratton, 1945; 331 pp.; $4.00.

- - - - - - - -

Since the Rorschach test is experiencing increasing popularity as one of the outstanding projective technics in the study of the personality, any book which describes the fundamentals of this procedure in a simple, straightforward manner is greatly welcomed. This the authors of this small volume have succeeded in doing. The first third of this book is spent in presenting the subject in a carefully organized, clearly written and readable fashion. So simple has the material been presented, that it should be understandable even to the beginner. The last two-thirds of the book contains detailed case material used to illustrate points in the interpretation of the test results. Each case is carefully discussed so that the reader can follow step by step the procedure in the test-scoring and the significance of the various scores.

This book should be a welcome addition to the needs of all those interested in the study of the personality and can be particularly recommended to the beginner as a means of acquiring a working knowledge of this most important test.

A. B.

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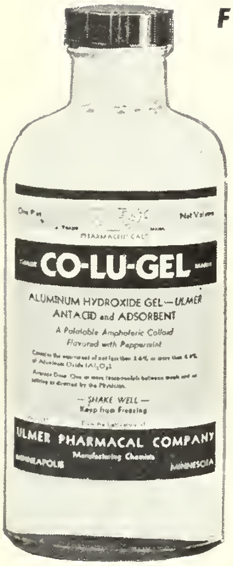

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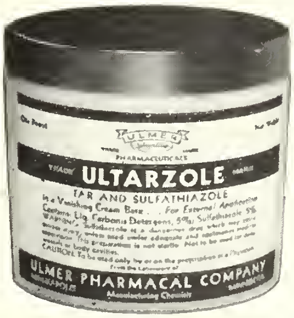

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Advertisers' Announcements

AMERICAN PHYSICIANS ART ASSOCIATION

Under date of June 30 and over the signature of its indefatigable vice president, A. L. Rose, Mead Johnson & Company, Evansville, Indiana, have issued a five-page circular letter reporting on the association's ninth annual exhibition and outlining the gains which have been made as well as how these points will affect 1948 and subsequent exhibitions.

The statement by the sponsor is very impressive. It shows the great progress of the movement, its expansion, the method of awarding the $34,000 in prizes and the composition of the jury, and lists the winning submissions. The statistics are interesting, the complimentary reference to the president of the association, Dr. Harvey Agnew, is deserved. Mr. Rose is honorary member number one of the association and his letter is illuminating and inspiring. (This is not his announcement but is inserted by the publishers as a tribute to a valuable and appreciated piece of promotional work.)

NEW RESEARCH LABORATORY FOR STERLING

Sterling Drug, Inc., of which Frederick Stearns & Co., Detroit, is a division, has made an agreement with the Mutual Life Insurance Company of New York as a result of which construction of a new laboratory for the Sterling-Winthrop Institute will start immediately at East Greenbush, N. Y., near Rensselaer. The project contemplates an investment of about three million dollars and will be completed within twelve to fourteen months. The new development, on the east bank of the Hudson River, will overlook the plants of Winthrop Chemical Company, Inc., a Sterling subsidiary. The agreement was signed by James Hill, Jr., president of Sterling Drug, Inc., and Henry Verdelin, vice president and manager of real estate for the insurance company and formerly an officer of the First National Bank of Minneapolis. New executive director of Sterling Drug, Inc., is Dr. Mark L. Hiebert, president of Frederick Stearns & Co.

NEW HOPE IN BREAST CANCER

Exceptionally favorable results in treatment of advanced carcinoma of the female breast with large doses of Oreton, testosterone propionate, have been reported by clinical research workers at New York's Memorial Hospital Cancer Clinic. Dr. Frank E. Adair, in a paper published in Surgery, Gynecology and Obstetrics 84:719 (1947) found that more than half of even the inoperable hopeless cases of breast cancer showed improvement in general health.

Relief from pain and regression of the metastases to the bone, with formation of new bone resulted. These excellent developments were obtained in patients for whom surgery and X-ray offered no help.

Dr. Adair states "We have now arrived at the point where it has become profitable to pursue the use of hormone therapy in certain types of human cancer. Up to this time we had been hampered in our clinical research; . . . Schering Corporation generously made it possible for us to commence our new attack employing large doses."

STREPTOMYCIN IN NEW FORM

A new highly-purified form of streptomycin is now being marketed as Streptomycin Merck (Calcium Chloride Complex), by Merck & Co., Inc., manufacturing chemists. The new form of the infection-fighting drug is a white, finely-divided substance close to chemical purity.

The outstanding advantage of the calcium chloride complex over streptomycin salts hitherto commercially available is the reduction of pain on injection. Clinical investigators have found this elimination of injection irritation to be especially important when the drug must be administered over a long period of time, as in the treatment of tuberculosis. Clinical studies have also indicated that this new pure form diminishes side reactions which were sometimes found with the earlier compounds.

Streptomycin, an antibiotic derived from a soil micro-organism, has been found especially valuable in certain acute forms of tuberculosis. Reports from large-scale clinical studies continue to confirm the early impression that streptomycin is of real value in the treatment of tuberculosis. It is also remarkably effective against certain infections that resist penicillin and the sulfa drugs. Among these are: influenzal meningitis, tularemia, and many urinary tract infections.

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The JOURNAL LANCET

Minneapolis, Minnesota
October, 1947

Vol. LXVII, No. 10
New Series

A Pathological Survey of the Appendix

Albert M. Harris, M.D.*
Sioux Falls, South Dakota

The most common major surgical procedure in most hospitals is appendectomy, yet the appendix is one of the least written about organs in the body. The 1945 *Index Medicus* lists about four times as many articles on the thyroid as on the appendix. Accordingly, a study of the latter organ seemed in order.

In undertaking this survey, the period from November 15, 1945, to July 1, 1946, was arbitrarily chosen. The specimens which came into the pathological laboratories of McKennan and Sioux Valley hospitals during this period were reviewed and the cases chosen which had only the appendix as a specimen from the operating room. The total number of such cases is 481. This method introduces two statistical errors. First, the surgeon might remove an acutely inflamed appendix and, in addition, an ovarian cyst. Second, a surgeon might remove an appendix while repairing a hernia. Neither type of case would be counted correctly.

At the beginning of the study the cases were arranged on the basis of the diagnosis. Fig. 1 gives the result of that arrangement.

	Total	Average	Male	Female	Youngest	Oldest	Pct.
Foreign body	1						
Periappendicitis	1						
Mucocele	1						
Fibroma	1						
Carcinoid	1						
Oxyuriasis	9	10	4	5	2	33	2
Chronic Appendicitis	5	29	3	2	7	46	1
Fecolith	11	25	6	5	18	39	2
Stenosis	33	50	17	16	16	69	7
Lymphoid Hyperplasia	59	15	32	27	3	48	16
Acute Appendicitis and Fecolith	16	16	8	8	4	57	3
Scarred (Male)	77	25			2	69	48
Scarred (Female)	145	20					
Acute Appendicitis (Male)	56	23			4	57	25
Acute Appendicitis (Female)	65	19					
	481						

Fig. 1. Incidence of Various Diagnoses.

Foreign bodies. Starting with the miscellaneous group of diagnosis of which there were only one each in the entire series, we have, first of all, foreign bodies. This particular case was in a male, aged eleven. This appendix was normal histologically but the lumen contained some human hair. The most common foreign body of the appendix encountered in the Dakotas is buckshot. Since the close of the survey, one case has been found among the tissue specimens. The buckshot are occasionally seen in the X-ray. Ordinarily, foreign bodies cause no difficulty as they are usually incidental findings.

Periappendicitis. The second of the miscellaneous group, periappendicitis, is a fairly common diagnosis when the appendix is removed as part of another operation. Women with salpingitis or any sort of pelvic inflammatory condition will frequently show an inflammation of the serosal surface of the appendix. In these instances usually more than the appendix is removed. It is significant that this particular case was in a female, age 28.

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Mucocele. The third of the miscellaneous group is mucocele. Mucocele of the appendix, or appendocele, is primarily a disease of the elderly. This case was in a male, age 57. The proximal portion becomes stenosed, leaving a lumen in the distal portion. The distal portion continues to produce mucus which dilates the organ somewhat and forms a sac filled with mucus. Theoretically, this is an easy sequence of events to have. However, it is rather uncommon because when there is obstruction in the proximal portion of the appendix, the distal portion usually contains sufficient infective material to lead to an acute appendicitis. As a matter of fact, obstruction is the most common cause of appendicitis.

Fibroma. The fourth miscellaneous case is of a fibroma in a female, age 40. This is a rather difficult diagnosis to make and is certainly open to considerable question because of the fibrosis usually seen in the appendix. A localized small fibrotic nodule had pushed the lumen far to one side and seemed to be a definite neoplastic process.

Carcinoid. The fifth of the miscellaneous group is carcinoid occurring in a male, age 43. Carcinoid of the appendix is not too uncommon. The tumor is usually an incidental finding in the removal of the appendix. It very seldom metastasizes and is essentially a pathological curiosity rather than a clinical entity. Chronic symptoms referable to the appendix may be associated with carcinoid.

Oxyuriasis. The more common pathological diagnoses of the appendix include oxyuriasis, of which there were 9 cases in the series. Pinworms is a disease of young people with an average age of 10 for the group. However, the oldest was 33, indicating a wide age distribution. No special effort was made to find the pinworms. None of the appendices were split longitudinally which is the preferable method. In fact, some of the pinworms were picked up in the lumen on microscopic examination. Symptoms of appendicitis probably do not arise from the presence of pinworms.

Chronic appendictis. The next item in the table is chronic appendicitis, with 5 cases. They showed a definite fibroblastic activity and mononuclear inflammatory cell infiltration, which could be interpreted as representing a chronic inflammatory process. Probably they are the reparative phase of a mild acute episode. However, these cases emphasize the one point—that granulomatous lesions of a chronic nature, such as tuberculosis and actinomycosis, do occur in the appendix. This possibility is one of the chief reasons for doing a histological examination.

Fecalith. The third group in the table is fecalith. There were 11 cases of fecalith with no other demonstrable pathology. The diagnosis of fecalith is a rather arbitrary one because when we diagnose fecalith we usually mean an oval-shaped fairly hard mass of fecal material. However, many appendices will contain fecal material which is at least partially impacted. The point where we consider the contents of the lumen as being merely somewhat thickened fecal material as differentiated from actual fecal stones is certainly a thin line. Furthermore, some stones were undoubtedly missed by the method of examination. The presence of a fecalith in the appendix may give rise to obstruction and inflammation at any time.

Acute appendicitis and fecalith. The fourth category is a combination of acute appendicitis and fecalith, with 16 cases. The average age is 16, with an even distribution between the sexes. This one group is a rather important part of the whole because it is the only one in which we can definitely point to an etiology for the appendicitis. From clinical experience it has long been recognized that obstruction is the chief factor which initiates the inflammatory process. It has been shown that obstruction of the lumen will lead to trouble.[1] The organ becomes a blind pocket into which fecal material can pass but from which material can be evacuated only with great difficulty. In these 16 cases, the obstruction which led to the inflammation was brought about by the fecalith.

Stenosis. The fifth is stenosis of the appendix. Here the lumen is completely obliterated. Most generally, the lumen is replaced by fibrous tissue although in some instances the replacement is by fat. There were 33 cases in the series with this diagnosis. The average age was 50 and the distribution between the two sexes is about even. The oldest age at which stenosis occurred was 69 and the youngest 16. An appendix which was the site of multiple small inflammatory processes might become stenotic or aging could result in the same picture.

Lymphoid hyperplasia. There were 59 such cases in the series with again about an equal distribution in the male and female. The average age is 15. Most probably this represents a normal physiological process related to the hypertrophy of tonsils which is encountered in young people with regression as the individual grows older. The diagnosis of lymphoid hyperplasia is an arbitrary one. Enlarged lymph follicles can produce obstruction and thus initiate an inflammatory process.[2]

Chronic constipation. A diagnosis which can be made from the lymphoid tissue is chronic constipation. Cascara and certain other vegetable laxatives contain pigment which is picked up by the phagocytic cells and gives a brownish discoloration of those cells as they lie in the lymphoid tissue of the submucosal area. The pigment is not confined to the appendix but is present throughout the colon. The finding is not of great significance but it is interesting for the pathologist to be able to tell the surgeon that his patient has been constipated over a considerable period of time. In three cases it was possible to do just that.

Scarred appendix. The seventh category is scarred appendix. The total number in this group was 222, which makes it the largest group. The youngest was two years of age and the oldest was 69. Seventy-seven males as against 145 females make up the group. In a case of scarred appendix, the various layers are essentially normal but there is some increase in fibrous tissue. Actually

Ages in Yrs.	Total	Male	Acute	Pct.	Female	Acute	Pct.
0 to 5	23	12	3	25	11	2	18
6 to 10	45	21	8	38	24	9	37
11 to 15	61	29	9	31	32	11	34
16 to 20	109	25	9	36	84	23	27
21 to 25	73	26	5	19	47	8	17
26 to 30	52	25	11	44	27	10	37
31 to 35	34	15	6	40	19	5	26
36 to 40	25	15	4	26	10	3	30
41 to 45	16	7	2	28	9	1	11
46 to 50	13	9	6	55	4	2	50
51 or over	30	20	5	25	10	2	20
	481	204	68	33.8	277	76	27.4

Fig. 2. Age incidence and percentage of acutely inflamed appendix.

there is no way of telling what is normal in amount of fibrous tissue and what is not. Probably the presence of fat in the submucosa suggests previous inflammation more than fibrosis does. In any event, there is in these appendices no definite evidence of obstruction and no active inflammatory process. The sex difference led to another survey on this material which will be described later.

Acute appendicitis. The eighth, and last, category is acute appendicitis, of which the total number was 121. The inflammatory process, which is initiated by an obstruction, gives rise to necrosis of the mucosa. This structure is partially replaced by granulation tissue. From this focus the inflammation extends through the wall. If the process continues, there is congestion, edema, more necrosis, and eventually perforation.

With regard to the totals in this chart, taking the five in the miscellaneous category, the appendices which were diagnosed as having pinworms, the appendices with an inflammatory reaction, and the fecaliths of appendix, the total is 167; the opposite category would include stenosis, lymphoid hyperplasia, and scarred appendix, with a total of 314. The percentage, then, of appendices in this series which showed a definite pathological process is 34.7, while those with none is 65.3.

There are a fairly large number of cases in which the symptoms which the patient presents are such that the surgeon cannot be sure the patient has an appendicitis; these he has to operate on. There are also a certain number of appendices in which no pathological lesion can be demonstrated but in which the patient will have regression of symptoms. However, in a survey of tissues removed at operations done in Memphis, Tennessee,[2] it was concluded that 60 per cent of the appendices should show some definite lesion. These percentages did not include incidental appendices.

per cent of the appendices showed some definite lesion. These percentages did not include incidental appendices.

The fact that there was such a high percentage of appendices with no demonstrable lesion coupled with the sex difference noted in the scarred appendices led to another breakdown of the cases. The results are shown in Fig. 2. The appendices in the various age groups were counted. There is a five-year span in each age group, with the exception of the last, and the figures for the ages are inclusive. The youngest patient was four months and the oldest 69 years. The age incidence of male and female shows a marked difference in the type of curve, as shown in the graph (Fig. 3). The marked spike in the curve at the age of 16 to 26 in the female is quite outstanding. The male curve is a relatively flat affair. In order to see how the incidence of the diagnosis of acute appendicitis was running in this group, they were counted in each age and for each sex. The total number here of pathological appendices is lower than in the previous survey in this series because only the appendices which showed a definite inflammatory process were counted.

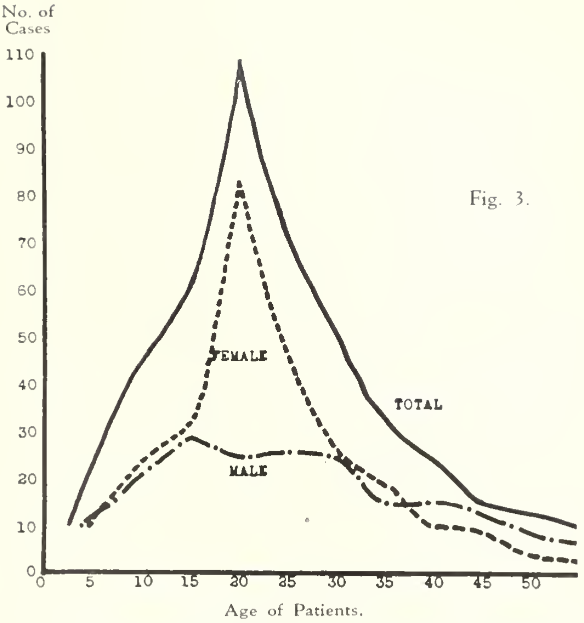

Fig. 3.

In the male appendices, 33.8 per cent showed a definite inflammatory lesion, while the female group had an incidence of 27.4. A fairly high percentage of the mistakes in the diagnosis of acute appendicitis is made in women between the ages of 16 and 26.[3] This is in the age when the menstrual cycle is being established. Most probably the reason for the mistakes is that the symptoms which simulate appendicitis are caused by some trouble with the reproductive apparatus, a so-called *mittelschmerz*.

Conclusions

1. A pathological survey of the appendix is offered with the purpose of acquainting the individual with the type of lesion which can occur in the appendix and the incidence of the various lesions.

2. A large proportion of the mistakes in diagnosis of acute appendicitis are in young females in which the symptoms are most probably related to minor disturbances of ovulation.

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The Continuous Follow-up Study of 500 Arthritics*

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THIS study presents the biographies of 500 arthritics. Usually 500 biographies would be contained in 500 volumes. This is exactly what each patient's history amounted to in fact, over years of hospitalization. Each volume contained a great deal of data and this had to be summarized, year by year, in order to be a chronological presentation. These condensed biographies were still confusing, so in order to see the picture as a whole or at a glance, as it were, the follow-up chart was originated. These charts made it possible to observe years of data without turning pages and thus losing the continuity of the story.

Events in each patient's history were charted chronologically, the chart being divided into spaces, one for each year of life. Below the written history on each chart were drawn five horizontal lines which indicated four arbitrary levels of functional activity, year by year. The top line, 100 per cent functional activity, represented the patient's optimal peak of activity, that is, his general health and environmental adjustments during the period preceding the onset of joint symptoms. At 75 per cent level, he had become handicapped, either in the use of arms or legs. Patients walking with the aid of crutches were put at this level. At 50 per cent, the patient lived a chair life: at 25 per cent, a bedridden and helpless life. The bottom line, zero, indicated death.

Life Courses A, B, C and D Superimposed

100% Patient's optimal level of functional activity.
75% Ambulatory but handicapped.
50% Chair life level.
25% Bed life level.

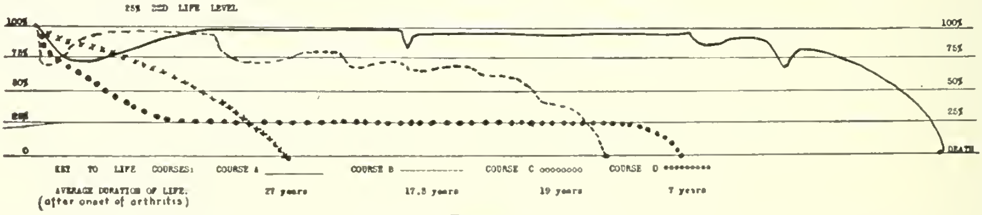

FIGURE 1

The summarizing and charting of the patients' life courses was done in 1931. At the end of 1934, 100 of these arthritics were dead. These 100 were studied first and from their charts a composite chart was made which was used as a yardstick with which to predict the life expectancy of the remaining 400. On going over the charts of these 100 dead, I found that they automatically had followed four roads from the time of the first disturbance of functional activity by symptoms, to time of death. These four courses were named A, B, C, and D.

Course A — Patients who had one attack of rheumatism (arthritis), recovered from it (in variable length of time), and returned to practically their former level of activity, at which level they continued, without recurrence of joint disturbance, until a terminal illness and death. Their average was 27 years after the onset of arthritis.

Course B — Patients who had remissions and relapses throughout life. They averaged 17½ years of life after the onset.

Course C — Patients whose joint disease led to a definitely lower level of physical activity and continued at this lower level until death. They lived an average of 19 years after onset. No one was put in course C unless he had remained at the lowered level of activity for five or more years. Thirty per cent of the C group reached their low in three years; 70 per cent took four to ten years.

Course D — Patients who showed steady, progressive joint involvement and increasing incapacity, practically without remissions, until they died. They lived an average of only seven years after the onset of the disease. They showed, also, extensive systemic involvement.

Autopsies were performed on 23 of the 100 dead. Two had followed life course A. These two, clinically and pathologically, were mixed arthritis, that is, they showed rheumatoid and degenerative changes. The actual cause of death was heart disease.

Nine followed course B. Four of these showed rheumatoid and degenerative changes. One died of miliary tuberculosis. All nine had cardio-circulatory involvements. Four of the nine showed healed pulmonary tuberculosis.

Seven followed course C. All were rheumatoid arthritis. One died of pulmonary tuberculosis, three others had healed tuberculosis, six had cardio-circulatory involvement.

Five followed course D. One of these had rheumatoid arthritis, three had degenerative arthritis and one rheumatoid and degenerative changes. All had cardiac pathology: one had healed tuberculosis.

These post mortem examinations, like the clinical studies, showed that courses A, B, and D are not correlated with the type of arthritis. The type of arthritis does not determine the duration of life after the onset of arthritis, nor the general health and social capacity

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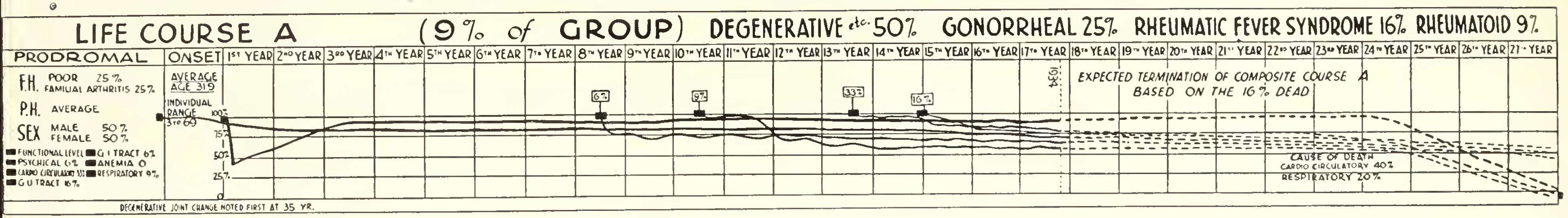
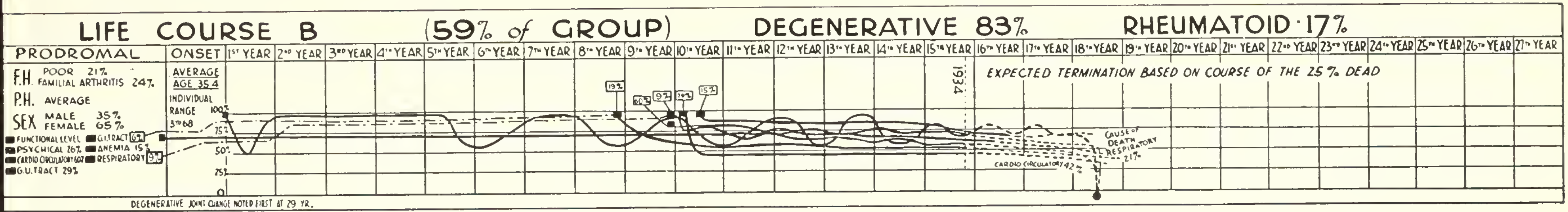
Read by invitation before the annual meeting of the South Dakota State Medical Association, June 2, 1947, at Rapid City.

YEARLY FOLLOW-UP STUDY OF 500 SO-CALLED ARTHRITICS

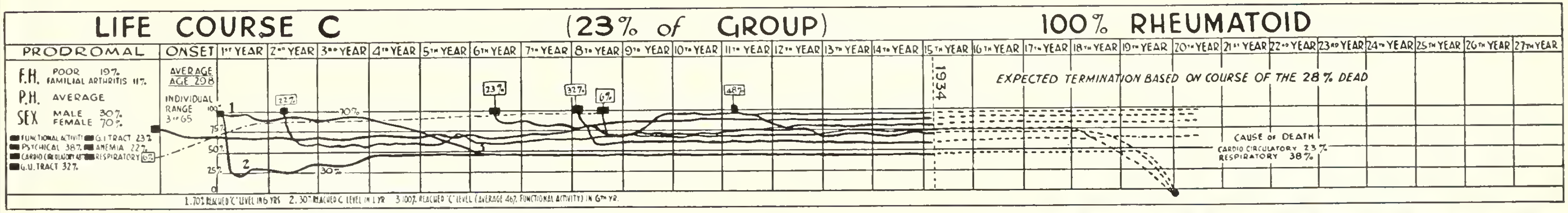
(75% ARE LIVING : 25% DEAD) (32% HAD GENUINE ARTHRITIS : 68% DIFFERENTIAL DIAGNOSES). ALL PATIENTS STUDIED FOLLOWED ONE OF FOUR LIFE COURSES.- A.B.C OR D. THE LIFE COURSE (CHARTED BY BLACK LINE) SHOWS THE VARIATIONS IN PATIENT'S LEVEL OF FUNCTIONAL ACTIVITY YEAR BY YEAR. THE ONSET OF INVOLVEMENT OF VARIOUS BODY SYSTEMS IS INDICATED BY COLORED LINES. · · · · THESE CHARTS ARE THE COMPOSITE PICTURE, (THE AVERAGE) OF THE 500 PATIENTS, CARRIED THRU THE YEAR 1934. THE DOTTED LINES INDICATE THE EXPECTED TERMINATION OF EACH COURSE BASED ON THE COMPOSITE PICTURE PRESENTED BY THE DEAD. · · · · GENUINE ARTHRITIS (ACTUAL DESTRUCTION PARTIAL OR COMPLETE, OF A JOINT) REPRESENTED BELOW BY TERM "RHEUMATOID"; DIFFERENTIAL DIAGNOSIS BY TERM "DEGENERATIVE. ETC."



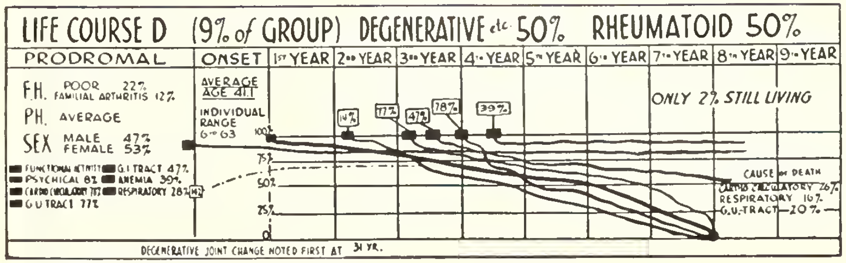
LIFE COURSE A (9% of GROUP) DEGENERATIVE etc. 50% GONORRHEAL 25% RHEUMATIC FEVER SYNDROME 16% RHEUMATOID 9%



LIFE COURSE B (59% of GROUP) DEGENERATIVE 83% RHEUMATOID·17%

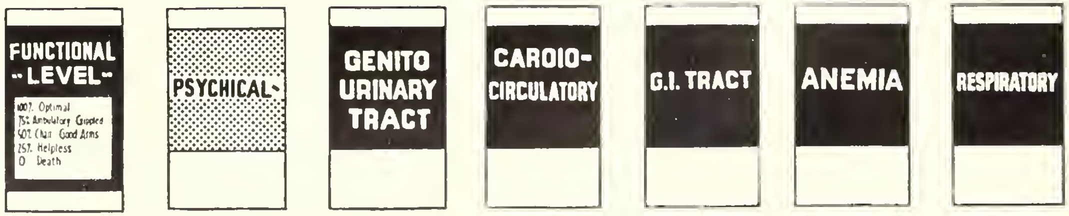


LIFE COURSE C (23% of GROUP) 100% RHEUMATOID



LIFE COURSE D (9% of GROUP) DEGENERATIVE etc. 50% RHEUMATOID 50%

H.A.NISSEN, M.D.



of the individual. Patients analyzed and charted in this manner prove that these are functions of the total individual, not of the type of his disease. The members of course C, however, are rheumatoid arthritics, whether the rheumatoid joint changes are added to pre-existing, symptomless, degenerative changes or not.

The chart (Fig. 2) of the 500, living and dead, deserves careful study: it is really an epitome of arthritis. A comparison of the differences in life courses A, B, C, and D is obvious. The years in which the largest percentage of systemic involvements are present, are seen readily. *Also, it shows that five years must elapse, after the first onset of joint complaints, to be certain as to which life course the patient will follow.* Life course B is the only life course in which one finds, consistently, remissions and relapses. Also a very important fact is that in life courses C and D, at the end of five years after the onset, sometimes earlier, there are high percentages of systemic involvements including cardio-circulatory, genito-urinary, gastro-intestinal, respiratory, arteriosclerosis, etc. So that in these two life courses, after five years duration, it is obvious that the measurable tissue changes are present because of the life course the patient is following.

It is most important to emphasize at this time that we must return to the years 1914 to 1936. The biographies containing the order sheets for treatment revealed the following: bed rest, hot fomentations, steam baths, massage, postural exercises, splints, casts, baking, small doses of thyroid extract, sodium bicarbonate, sodium phosphate, dilute hydrochloric acid, aspirin and liquorice powder. Some received codliver oil and typhoid vaccine, and most of them had the average hospital diet. In other words, from an internist's point of view, these arthritics were essentially untreated arthritics. They were treated orthopedically: this means surgery, reconstruction of joints, manipulation under anesthesia, braces, etc. So that these life course charts practically portray the natural course of arthritis.

A special study of arteriosclerosis was made in this group of arthritics. Serial X-ray plates and films, for a period of twenty years, were available of 251 patients. At different ages, 141 of these patients showed probable, definite, or marked arteriosclerosis. One hundred twenty-three were in the first four decades of life; 28 were over 40 years of age. In this latter group 72 per cent showed sclerosis. This, one expects to find, but certainly one does not expect to find that in a group of 123 who were under 40 years of age that there would be 48 patients, or 38 per cent, to show probable to definite sclerosis and this is exactly what they did show. It is most significant that 33, or 26 per cent, of this group of 123 patients showed arteriosclerosis under the age of 40. Most astonishing of all, 12 of 33 patients were under 30 years of age. Figure 3 indicates the short period of time in which normal blood vessels can change to visible, definite and marked sclerosis. In this group, 65 patients, or 26 per cent, showed various nephropathies or abnormal kidney function, ranging from occasional albumin to occasional blood cells to definite nephritis; 62, or 25 per cent, had clinical heart abnormalities.

FIGURE 3

Serial Radiograms of Some of the Arthritics Studied

Vessel Change

Patient	Negative	Visible	Questionable	Definite	Marked	Type Arthritis	Age
Male	X					Mixed	32
				X			34
Male	X					Struempell-	25
			X			Marie	33
Male	X					Struempell-	19
				X		Marie	20
Male		X				Rheum. Fever	16
				X		Syndrome	18
Male	X					Rheum. Fever	27
				X		Syndrome	29
Male			X			G. C.	27
				X		Arthritis	30
Male			X			Rheum. Fever	28
				X		Syndrome	35
Male		X				G. C.	32
				X			33
Male		X				T. B.	27
				X		Arthritis	30
Male	X					Type 1*	33
				X			35
Male		X				Type 1	22
				X			27
					X		28
Male		X				Type 1	34
				X			38
Female			X			G. C.	23
				X			26
Female		X				Type 1	24
				X			28
Female		X				Type 1	24
			X				27
Female		X				Type 1	19
			X				21
				X			25
Female		X				Type 1	39
			X				49
				X			50
Male			X			Type 1	38
				X			42
					X		44

*Rheumatoid arthritis.

Those were the days before sulfa drugs, penicillin, streptomycin and vitamin therapy, particularly vitamin D in large dosages. This means that one must accept the fact that arteriosclerosis is more likely to appear in the arthritic at an earlier age and is part of the arthritic syndrome, or we must look elsewhere for some other explanation.

In any group of so-called arthritics, 68 per cent or more can be assured of improvement. In this paper, the 68 per cent are listed under the diagnosis of degenerative or tissue change. The remaining 32 per cent, rheumatoid arthritics, largely follow course C and constitute the problem for further investigation and life course follow-up charts.

SUMMARY

This paper presents the history of the development of the continuous follow-up life course study of the arthritic. The biographies of the dead arthritics when charted showed four life courses. These were named A, B, C and D. The 400 living were charted in a similar manner and it has been shown that they followed similar courses to the dead. One of the studies made of this group of arthritics emphasizes the development of arteriosclerosis in fairly young arthritics. This sclerosis could not be proved in any way to be due to any kind of treatment in vogue from 1914 to 1934. So that in this group, one certainly cannot say that large doses of vitamin D or any other form of treatment, at that time, could be the cause. Also, in this group showing or developing sclerosis, 65, or 25 per cent, showed heart abnormalities. These varied from hypertrophy to auricular fibrillation and it cannot be said that these were the result of, or due to, any form of treatment at that time.

Rheumatoid arthritis is a fairly rare disease. Obviously, the next step is to compare, in a similar fashion, the course of the arthritic from 1940 to date with these previously studied.

NATIONAL CANCER INSTITUTE TO AID MEDICAL SCHOOLS IN CANCER INSTRUCTION

The National Cancer Institute is now prepared to give aid to medical schools for further development of courses in cancer for medical students, Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service, announced. For the first time the National Cancer Institute received authority from the Congress this year to make grants-in-aid to medical schools for this purpose. All of the grants made by the National Cancer Institute in the past have been for the support of research work on cancer.

This new activity of the National Cancer Institute is being inaugurated on the recommendation of the National Advisory Cancer Council which in turn based its recommendations on the results of a conference on cancer in the medical school curriculum held at the National Cancer Institute by a committee of medical educators.

Dr. Parran stated that the new program of aid to medical schools is designed to place greater emphasis upon the integration of cancer instruction in the total undergraduate curriculum. The deans of all medical schools have been advised that the National Advisory Cancer Council is prepared to receive applications for financial assistance in expanding their cancer teaching programs.

RESEARCH FELLOWSHIPS — THE AMERICAN COLLEGE OF PHYSICIANS

The American College of Physicians announces that a limited number of Fellowships in Medicine will be available from July 1, 1948 to June 30, 1949. These Fellowships are designed to provide an opportunity for research training either in the basic medical sciences or in the application of these sciences to clinical investigation. They are for the benefit of physicians who are in the early stages of their preparation for a teaching and investigative career in Internal Medicine. Assurance must be provided that the applicant will be acceptable in the laboratory or clinic of his choice and that he will be provided with the facilities necessary for the proper pursuit of his work. The stipend will be from $2,200 to $3,000.

Application forms will be supplied on request to The American College of Physicians, 4200 Pine Street, Philadelphia 4, Pennsylvania, and must be submitted in duplicate not later than November 1, 1947. Announcement of the awards will be made as promptly as possible.

REGIONAL MEETING OF AMERICAN COLLEGE OF PHYSICIANS

It has been recently announced by Dr. K. L. Puestow of Madison, Governor of the American College of Physicians for Wisconsin, that the regional meeting of the College will be held in Milwaukee on Saturday, November 15, with headquarters at the Hotel Schroeder. The scientific program extends from 8:30 in the morning until 5:00 o'clock in the afternoon, including the noon luncheon period for college members and guests of the College. A cocktail hour and dinner are planned for the evening. The states other than Wisconsin invited to participate in the regional meeting are Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Montana, Nebraska, North Dakota, South Dakota and Wyoming. Further details concerning the program will be announced later. This meeting will take place on the day following the conclusion of a two-week postgraduate course being offered by the Medical School at the University of Wisconsin and sponsored by the American College of Physicians.

Long Unrecognized Foreign Bodies in the Air and Food Passages:

Report of Two Cases

Paul G. Bunker, M.D.
Aberdeen, South Dakota

THE following two cases are presented because of their unusual interest, as well as to alert the members of the medical profession to the possibility of unrecognized foreign bodies. Vegetable foreign bodies in the tracheobronchial tree not infrequently give rise to very few symptoms, and in the absence of a positive history of such an aspiration, may easily be overlooked. The tracheobronchial tree is especially tolerant of seeds such as watermelon and sunflower. Any suspected case of bronchial asthma in which the history and allergic studies are negative should be bronchoscoped. In two such cases in my own experience, watermelon seeds were found and removed.

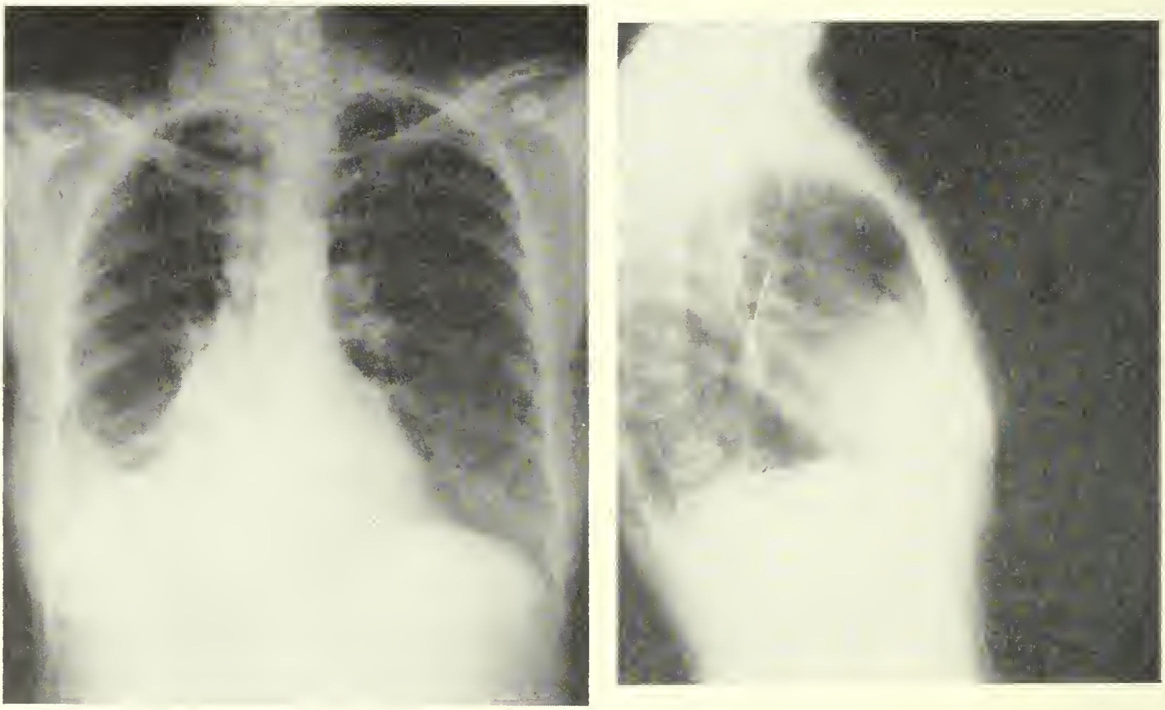


Fig. 1. Roentgenograms A and B, taken December 29, 1941, show the pointed shaft and ring of a safety pin in the right main bronchus.

On the other hands, certain foreign bodies such as a bean, raw carrot, or peanut may produce such violent reactions within the tracheobronchial tree that death may follow in a matter of hours, unless relieved bronchoscopically. Death is usually due to the so-called "drowned lung" in these cases and not to a pneumonic process. In cases where this does not occur, emphysema followed by atelectasis is the usual course. This may be followed by bronchiectasis, lung abscess, or even empyema if not relieved.

A very high percentage of foreign body cases reaching the broncho-esophagologist give a positive history of choking or swallowing such an object. This is a significant fact when one considers how easily this can happen in an infant when a parent is not present to recognize it. Consequently, when I hear of an infant dying of a pneumonia of two or three days duration, the possibility of an unrecognized foreign body always occurs to me.

Unrecognized foreign bodies in the esophagus are comparatively rare, as dysphagia is usually present and signs of infection develop in a matter of days. In fact, the esophagus is so sensitive that the trauma produced by a foreign body passing through it into the stomach may be sufficient to produce all the symptoms of a foreign body within the esophagus. A foreign body which has perforated the esophagus, either spontaneously or as the result of blind attempts at removal, may produce a short, symptom-free period until signs of mediastinitis develop.

CASE 1. SAFETY PIN IN RIGHT MAIN BRONCHUS
(35-Plus Years Duration)

Mrs. F. R., age 40 years, was referred to me by Dr. C. E. Lowe with the diagnosis of a safety pin in the right main bronchus. The history, as obtained from the patient, was that she had had a chronic productive cough as long as she could remember; she could not recall ever of aspirating a foreign body. An older sister stated she was positive that Mrs. R.'s cough had existed since before the age of 5 years. She experienced her first pulmonary hemorrhage at the age of 15, and had had them periodically since then, but with increasing severity and frequency the last few months. During all these years she had gone through four pregnancies, besides attending to the many varied duties of a rancher's wife. While she consulted various physicians from time to time, *no roentgenograms* were taken until she consulted Dr. C. E. Lowe.

The roentgenograms (AP and lateral) show the pointed shaft of a safety pin with the spring attached lying in the right bronchus and apparently extending into one of the posterior basal segmental bronchi. The posterior portion of the lower lobe of the lung shows a fibrotic type of collapse with retraction of the heart and mediastinum to the right. In addition, she has a secondary scoliosis and a definite reduction in size of the thoracic cage on the right side.

The foreign body was removed December 30, 1941, without difficulty. The pin was buried in granulation tissue, and the whole was bathed in pus. The pin was moderately adherent but was easily freed and withdrawn through a 9 mm. bronchoscope by using a Tucker forceps. No free bleeding was encountered, but there was a general oozing which made further examination impossible.

Her immediate convalescence was uneventful, and she gained 8 pounds in weight the first month. Her cough became less frequent, with greatly reduced sputum. Four months later, she had several minor hemorrhages associated with an influenzal infection. In subsequent communications she states that she has continued to improve to a point where she is unwilling to consider lobectomy for a complete cure.

It is interesting to conjecture as to what happened to the keeper and keeper shaft of the pin. My supposition is that the pin must have been closed at the time of aspiration, and that the long continued action of the bronchial secretions resulted in sufficient disintegration of the keeper shaft so that fragments broke off and were coughed out.

Case 2. Safety Pin in Hypopharynx
(3-Plus Months Duration)

Baby G. H., age 11 months, was admitted to St. Luke's Hospital August 21, 1945, at the reference of Dr. J. H. Garberson. According to the history, the baby had had great difficulty in swallowing since early in May. In addition, there was difficulty in breathing when the baby was excited or asleep but little coughing was present. The baby had an excessive accumulation of saliva in the pharynx, as well as some huskiness. A moderate sized swelling had been present in the left side of the neck since two weeks after the onset of her symptoms. The baby had been under treatment for rickets, but it was not until she was seen by Dr. Garberson and roentgenographs made that the diagnosis was established. The roentgenographs revealed a moderate sized open safety

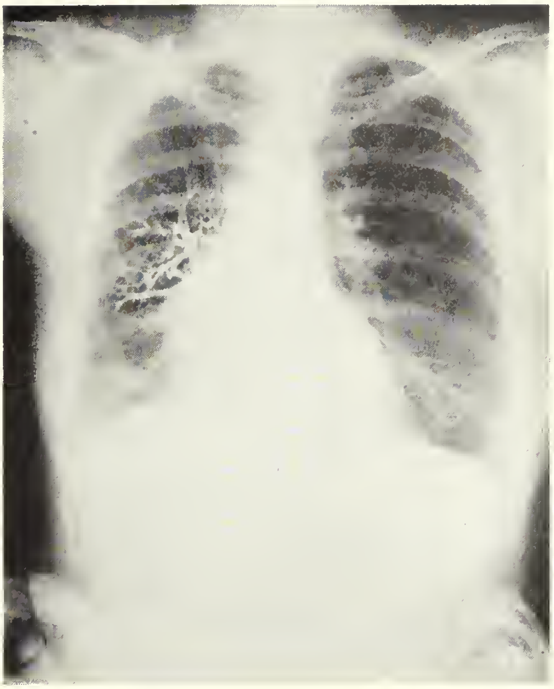


Fig. 2. After-ray with iodized oil injected, taken March 19, 1942, shows a stenosis of the right lower lobe bronchus with secondary atelectasis. Cylindrical type of bronchiectasis is also visualized.

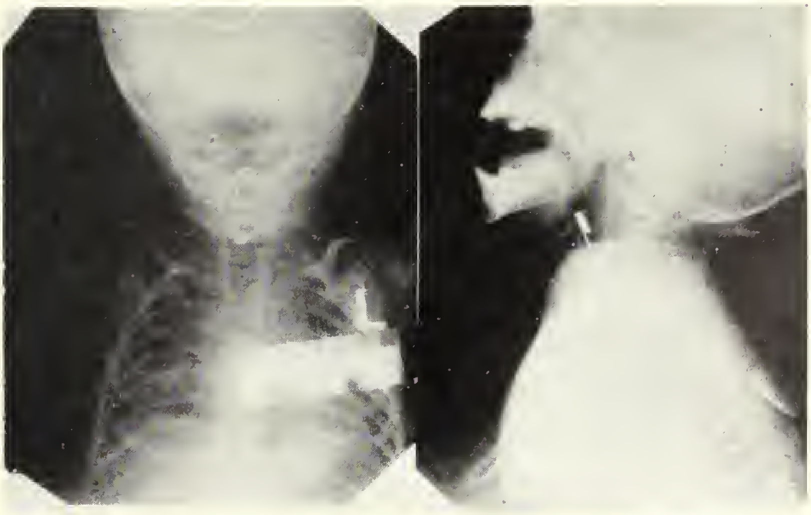


Fig. 3. AP and lateral roentgenograms show a moderate sized open safety pin with pointed shaft to the left extending from the retrolaryngeal area up into the hypopharynx.

pin in the pyriform sinuses extending up into the hypopharynx. The pointed shaft was to the left.

Surgical report: The anterior commissurescope was introduced and the safety pin located in the pyriform sinuses. The pin was rotated around the tip of the anterior commissurescope using the Bunker technic[1] and the pin removed without difficulty. The point of the pin was imbedded in the hypopharyngeal wall and there was evidence of inflammation and infection at this point. The baby made a prompt recovery with complete cessation of all symptoms.

COMMENT

1. Unrecognized foreign bodies in the air and food passages are more frequent than commonly recognized.
2. A careful history, plus proper consideration of it, will usually lead to the diagnosis.
3. The cough reflex fatigues rapidly leading to a quiescent period which may be misleading.
4. A foreign body in the tracheobronchial tree can produce all the symptoms of tuberculosis except a positive sputum.
5. Roentgenographic evidence may be lacking in a non-opaque foreign body, but roentgenograms should always be made. Typical secondary lung findings are usually apparent. With opaque foreign bodies, the diagnosis is readily made. Foreign bodies may not always be as suspected, and the true identity can be established before removal.
6. A pledget of cotton saturated in barium may adhere to a non-opaque foreign body in the esophagus, thus localizing the foreign body in the roentgenogram.
7. The importance of a wheeze cannot be overemphasized.
8. Asthmatoid rales, tympanitic percussion note, diminished or absent breath sounds suggest presence of a bronchial foreign body where there has been choking on such an object.
9. Two unusual cases of long unrecognized foreign bodies are presented.

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SCHOLAR IN MEDICAL SCIENCE PROGRAM ANNOUNCED BY MARKLE FOUNDATION

An opportunity to start a career in academic medicine is offered to young scientists with the necessary training to hold a regular faculty appointment and to conduct original research through a new program of "post-fellowship" grants, announced by the John and Mary M. Markle Foundation. The purpose of the program, according to John M. Russell, Executive Director of the Foundation, is to attract much-needed talent to academic medicine by giving promising young scientists academic security and financial assistance for a period up to five years. The program will be conducted in cooperation with accredited medical schools in the United States and Canada. Grants of $25,000, payable to the cooperating school at the rate of $5,000 annually for a five-year period toward the support of each successful candidate or his research or both, will be available beginning with the academic year 1948-49. If the plan proves successful, the Foundation will appropriate a total of $1,250,000 to the schools by 1953.

Candidates will be recommended by medical schools and will be limited to young men and women with a particularly strong interest in research and teaching in any of the clinical or preclinical sciences or in the sciences basic to medicine. They will have had training in some special field or combination of fields to qualify them to receive a regular faculty appointment and to conduct original research. The final choice will be made, on the basis of the schools' recommendations, by regional committees appointed by the Foundation.

ANNOUNCEMENT OF VAN METER PRIZE AWARD

The American Association for the Study of Goiter again offers the Van Meter Prize Award of $300 and two honorable mentions for the best essays submitted concerning original work on problems related to the thyroid gland. The Award will be made at the annual meeting of the Association which will be held in Toronto, Canada, May 6, 7, 8, 1948, providing essays of sufficient merit are presented in competition.

The competing essays may cover either clinical or research investigations; should not exceed 3,000 words in length; must be presented in English; and a typewritten double spaced copy sent to the corresponding secretary, Dr. T. C. Davison, 207 Doctors Building, Atlanta 3, Georgia, not later than February 1, 1948.

Transactions of the South Dakota State Medical Association

Sixty-Sixth Annual Session
Rapid City, South Dakota
June 1-3, 1947

OFFICERS, 1947-48

PRESIDENT	
H. RUSSELL BROWN, M.D.	Watertown
PRESIDENT-ELECT	
J. L. CALENE, M.D.	Aberdeen
VICE-PRESIDENT	
W. H. SAXTON, M.D.	Huron
SECRETARY-TREASURER	
R. G. MAYER, M.D.	Aberdeen
EXECUTIVE SECRETARY	
MR. JOHN C. FOSTER	Sioux Falls
DELEGATE TO A.M.A.	
WILLIAM DUNCAN, M.D.	Webster
ALTERNATE DELEGATE TO A.M.A.	
H. RUSSELL BROWN, M.D.	Watertown
CHAIRMAN COUNCIL	
C. E. ROBBINS, M.D.	Pierre

COUNCILORS

FIRST DISTRICT	
J. D. ALWAY, M.D. (1950)	Aberdeen
SECOND DISTRICT	
M. W. LARSEN, M.D. (1950)	Watertown
THIRD DISTRICT	
G. E. WHITSON, M.D. (1948)	Madison
FOURTH DISTRICT	
C. E. ROBBINS, M.D. (1950)	Pierre
FIFTH DISTRICT	
W. H. SAXTON, M.D. (1948)	Huron
SIXTH DISTRICT	
J. H. LLOYD, M.D. (1948)	Mitchell
SEVENTH DISTRICT	
L. J. PANKOW, M.D. (1948)	Sioux Falls
EIGHTH DISTRICT	
E. M. STANSBURY, M.D. (1950)	Vermillion
NINTH DISTRICT	
R. E. JERNSTROM, M.D. (1949)	Rapid City
TENTH DISTRICT	
R. J. QUINN, M.D. (1949)	Burke
ELEVENTH DISTRICT	
A. W. SPIRY, M.D. (1949)	Mobridge
TWELFTH DISTRICT	
D. A. GREGORY, M.D. (1949)	Milbank
COUNCILOR AT LARGE	
F. S. HOWE, M.D. (1948)	Deadwood

STANDING COMMITTEES

SCIENTIFIC WORK	
H. RUSSELL BROWN, M.D.	Watertown
J. L. CALENE, M.D.	Aberdeen
R. G. MAYER, M.D.	Aberdeen
PUBLIC POLICY AND LEGISLATION	
H. RUSSELL BROWN, M.D.	Watertown
J. L. CALENE, M.D.	Aberdeen
THE COUNCIL	
PUBLICATIONS	
R. G. MAYER, M.D.	Aberdeen
THE COUNCIL	
MEDICAL DEFENSE	
W. G. RIEB, M.D. (1948)	Parkston
C. J. McDONALD, M.D. (1949)	Sioux Falls
G. W. MILLS, M.D. (1950)	Wall
MEDICAL EDUCATION AND HOSPITALS	
J. L. CALENE, M.D. (1948)	Aberdeen
T. F. RIGGS, M.D. (1949)	Pierre
F. S. HOWE, M.D. (1950)	Deadwood
MEDICAL ECONOMICS	
M. W. LARSEN, M.D. (1948)	Watertown
M. W. PANGBURN, M.D. (1949)	Miller
W. A. DAWLEY, M.D. (1950)	Rapid City
PUBLIC HEALTH	
G. J. VAN HEUVELEN, M.D. (General Chairman)	Pierre
Sub-committee on Cancer	
O. S. RANDALL, M.D. (1948)	Watertown
H. E. DAVIDSON, M.D. (1949)	Lead
P. V. McCARTHY, M.D. (1950)	Aberdeen
Sub-committee on Tuberculosis	
W. L. MEYER, M.D. (1948)	Sanator
D. S. BAUGHMAN, M.D. (1949)	Madison
A. W. SPIRY, M.D. (1950)	Mobridge
Sub-committee on Mental Hygiene and Child Welfare	
J. D. BAILEY, M.D. (1948)	Rapid City
G. ZIMMERMAN, M.D. (1949)	Sioux Falls
F. W. HAAS, M.D. (1950)	Yankton
Sub-committee on Syphilis Control and U.S.P.H. Service	
GILBERT COTTAM, M.D. (1949)	Pierre
ANTON HYDEN, M.D. (1948)	Sioux Falls
F. J. TOBIN, M.D. (1950)	Mitchell
NECROLOGY	
W. G. MAGEE, M.D. (1948)	Watertown
R. A. WEBER, M.D. (1949)	Mitchell
H. L. SAYLOR, M.D. (1950)	Huron
MEDICAL BENEVOLENCE AND ADVISORY TO WOMEN'S AUXILIARY	
G. A. STEVENS, M.D. (1948)	Sioux Falls
J. C. SHIRLEY, M.D. (1949)	Huron
C. E. SHERWOOD, M.D. (1950)	Madison

SPECIAL COMMITTEES

RADIO BROADCAST	
R. E. JERNSTROM, M.D.	Rapid City
V. I. LACEY, M.D.	Yankton
A. M. HARRIS, M.D.	Sioux Falls
EDITORIAL	
GILBERT COTTAM, M.D.	Pierre
C. E. SHERWOOD, M.D.	Madison
J. C. SHIRLEY, M.D.	Huron
WM. DUNCAN, M.D.	Webster
R. G. MAYER, M.D.	Aberdeen
DONALD SLAUGHTER, M.D.	Vermillion
F. S. HOWE, M.D.	Deadwood
H. RUSSELL BROWN, M.D.	Watertown
MEDICAL LICENSURE	
LYLE HARE, M.D.	Spearfish
J. D. ALWAY, M.D.	Aberdeen
GILBERT COTTAM, M.D.	Pierre
ALLIED GROUP	
R. A. WEBER, M.D.	Mitchell
J. A. KITTELSON, M.D.	Sioux Falls
R. J. QUINN, M.D.	Burke
VETERANS ADMINISTRATION AND MILITARY SERVICE	
FARIS PFISTER, M.D.	Webster
G. E. WHITSON, M.D.	Madison
J. V. McGREEVY, M.D.	Sioux Falls
R. E. BUCHANAN, M.D.	Huron
M. R. GELBER, M.D.	Aberdeen
SPAFFORD MEMORIAL FUND	
J. C. OHLMACHER, M.D.	Vermillion
PREPAYMENT AND INSURANCE PLANS	
H. RUSSELL BROWN, M.D.	Watertown
C. E. ROBBINS, M.D.	Pierre
R. E. JERNSTROM, M.D.	Rapid City
R. G. MAYER, M.D.	Aberdeen
C. E. SHERWOOD, M.D.	Madison
WM. DUNCAN, M.D.	Webster

NATIONAL LEGISLATION

J. L. CALENE, M.D.	Aberdeen
H. RUSSELL BROWN, M.D.	Watertown
WM. SAXTON, M.D.	Huron
R. G. MAYER, M.D.	Aberdeen
C. E. ROBBINS, M.D.	Pierre

RURAL MEDICAL SERVICE

A. P. PEEKE, M.D.	Volga
M. M. MORRISSEY, M.D.	Pierre
G. J. BLOEMENDAAL, M.D.	Ipswich

MEDICAL SCHOOL AFFAIRS

DONALD SLAUGHTER, M.D. (chairman)	Vermillion
WM. DUNCAN, M.D.	Webster
L. J. PANKOW, M.D.	Sioux Falls
WM. SAXTON, M.D.	Huron
F. R. WILLIAMS, M.D.	Rapid City

REVISION OF CONSTITUTION AND BY-LAWS

R. G. MAYER, M.D. (chairman)	Aberdeen
C. E. ROBBINS, M.D.	Pierre
H. RUSSELL BROWN, M.D.	Watertown

NURSING TRAINING

E. M. STANSBURY, M.D.	Vermillion
D. A. GREGORY, M.D.	Milbank
R. E. LEMLEY, M.D.	Rapid City

STATE LEGISLATION

G. I. COTTAM, M.D.	Sioux Falls
MAGNI DAVIDSON, M.D.	Brookings
WM. SAXTON, M.D.	Huron
M. W. LARSEN, M.D.	Watertown
G. W. MILLS, M.D.	Wall

Advisory to State Board of Health

OTOLARYNGOLOGY

PAUL BUNKER, M.D.	Aberdeen

OPHTHALMOLOGY

C. M. KERSHNER, M.D.	Brookings

ORTHOPEDICS

V. E. VAN DEMARK, M.D.	Sioux Falls

MATERNAL WELFARE

E. A. PITTENGER, M.D.	Aberdeen

CHILD WELFARE

MARY SCHMIDT, M.D.	Watertown

ANNUAL MEETING OF THE COUNCIL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION

First Session, Saturday, May 31, 1947

The First session of the Council was held in the Alex Johnson Hotel, the meeting being called to order at 8:45 P.M. by the Chairman, Dr. C. E. Robbins of Pierre. On roll call the following officers and councilors were present: President, F. S. Howe, Deadwood; President-Elect, H. Russell Brown, Watertown; Vice-President, J. L. Calene, Aberdeen; Secretary-Treasurer, R. G. Mayer, Aberdeen; Executive Secretary, John C. Foster, Sioux Falls; Councilors—E. A. Pittenger, Aberdeen (substituting for J. D. Alway); M. W. Larsen, Watertown; C. E. Robbins, Pierre; W. H. Saxton, Huron; J. H. Lloyd, Mitchell; L. J. Pankow, Sioux Falls; E. M. Stansbury, Vermillion; R. E. Jernstrom, Rapid City; R. J. Quinn, Burke; A. W. Spiry, Mobridge; Wm. Duncan, Webster. Dr. Gilbert Cottam, Pierre, and Mr. Karl Goldsmith, Pierre, were also present.

The minutes of the previous session were read and approved. Executive Secretary John C. Foster gave an informal report of the past year, including the financial report of the Medical Association and the Veterans Administration program. A discission of the Veterans Administration home town care program followed. Chairman Robbins read the report of the Council's activities during the past year to be presented to the House of Delegates and discussion of the report followed.

Chairman Robbins appointed Drs. Wm. Saxton, R. J. Quinn and R. E. Jernstrom as the committee on Auditing and Appropriation. A motion was made by Pankow, seconded by Lloyd, that the salary of the Executive Secretary be raised to $6000 per year, but action was deferred until the meeting of the Committee on Auditing and Appropriations. The Council decided to meet at 12:30 P.M. Sunday, June 1, to hear the report of this committee.

Mr. Karl Goldsmith discussed the funds remaining in the Farmers' Aid Corporation, the potential income to be waived by the physicians individually and turned over to the State Medical Association. The Secretary presented the blank waivers to be signed by the physicians.

Chairman Robbins read a letter from George Keinholtz regarding the clinic for cerebral palsy to be held this fall. A motion was made by Dr. Howe, seconded by Dr. Stansbury and carried that the Council endorse the clinic. On motion the meeting adjourned at 10:30 P.M.

Second Session, June 1, 1947

The meeting was called to order by the Chairman, Dr. C. E. Robbins, and on roll-call the following officers and councilors were present: Drs. Howe, Brown, Calene, Mayer, Larsen, Robbins, Saxton, Lloyd, Pankow, Stansbury, Jernstrom, Quinn, Spiry, Duncan. Dr. Saxton read and explained the budget as prepared by the Committee on Auditing and Appropriations, and moved its adoption. The motion was seconded by Dr. Calene and carried unanimously. Dr. Pankow restated the motion that he made at the previous session that the salary of the Executive Secretary be raised to $6000.00 per year, in monthly installments. The motion was seconded by Dr. Stansbury, and after considerable discussion, carried unanimously. Mr. Karl Goldsmith asked if a contract should be drawn up, and it was decided that only a letter of acceptance from Mr. Foster would be necessary. On motion the meeting adjourned at 1:05 P.M.

Third Session, June 2, 1947

The third meeting of the Council was called to order at 10:25 P.M., June 2, by Chairman Robbins and on roll-call the following officers and councilors were present: Drs. Brown, Calene, Mayer, Foster, Pittenger, Robbins, Saxton, Pankow, Stansbury, Jernstrom, Quinn, Spiry, Duncan. Dr. Pankow discussed the need for more time for complete discussion of committee reports at House of Delegates meetings and general discussion followed. Dr. Brown discussed the subject of public relations with members of the state legislature and suggested that the State Medical Association give each member of the legislature a subscription to *Hygeia*. A motion was made by Dr. Calene, seconded by Dr. Pittenger and carried that the Secretary find out what the cost would be.

A general discussion followed on the budget. The Chairman asked for nominations for Chairman of the Council for the ensuing year. Dr. Pittenger nominated Dr. C. E. Robbins, Pierre; Dr. Jernstrom moved that nominations be closed and the Secretary cast a unanimous ballot for Dr. Robbins. Motion seconded by Dr. Calene and carried. Dr. Pankow moved that the Executive Secretary write to the Nurses Association to have representatives meet with the Council at some future meeting to discuss the nursing situation. Motion seconded by Dr. Stansbury and carried. On motion the meeting adjourned at 12:00 P.M.

R. G. MAYER, M.D., Secretary

REPORT OF THE PRESIDENT

1946-47

The year has been a hectic one so far as the activities of the State Medical Association are concerned for the reason that we have, during this fiscal year, inaugurated new policies and new activities. At our Aberdeen meeting your Council, by unanimous vote, selected Mr. John C. Foster as executive secretary for the association. This was concurred in by the House of Delegates. Mr. Foster assumed his duties as of July 1st, 1946. We believe that this arrangement is working out very satisfactorily. Mr. Foster has, in my judgment, been very efficient. Appointing an executive secretary has brought our association in line with our neighboring states and has been distinctly a step in advance.

This change in policy has meant new duties and responsibilities for our association. The first step was the taking over of the Veterans Administration program for the state of South Dakota. The medical end of this program is now handled entirely through your state association, the details being taken care of through the office of the executive secretary. This office was established at Sioux Falls because of its proximity to the Veterans Administration. For handling the details of this work, your association draws 10 per cent on all bills which are allowed by the Veterans Administration. On account of the red tape which seems to be necessary in the establishment of any Veterans Administration program, we were not able to get the program going until December 1946. While there are still many details to be ironed out, we believe, as a whole, the program is working out quite satisfactorily. We are told that our program in South Dakota is working much more smoothly than in our neighboring states that have adopted a similar program.

The second activity was the handling through our association of the pre-paid insurance plan. It was felt by your officers that in order to successfully oppose socialized medicine we must have something to offer in its place. A committee headed by Dr. H. R. Brown, your president-elect, worked long and diligently on such a program. The St. Paul Mercury Indemnity Company was selected to take over the program. We have had very valuable assistance from their officers and a program was worked out which has been in force since February 1947. The terms of the policy, known as the South Dakota Plan, are quite liberal and we believe that the cost is as low as it is possible to make it at this time. We would suggest, however, that a much more aggressive campaign must be put on if we are to get the membership which we should have. While the doctors can give valuable assistance in endorsing the plan and suggesting to their patients that we have the South Dakota plan, which is endorsed by the State Medical Association and which we believe to be a thoroughly practical plan, it is after all not up to the medical profession to sell the insurance. This must be done by representatives of the company and at this time we would certainly urge that the St. Paul Mercury Indemnity Company put on an aggressive campaign for members. If this is not done, we will again be faced with the plea for socialized medicine.

Your association, along with most other state associations, has been very weak in its public relations. It is our belief that through our full-time executive secretary, the public relations will be recognized as an important function of your association. We would urge, not only our executive secretary, but various members of our association to do everything in their power to establish better public relations. This can be done by speaking before service clubs, women's clubs, and other organizations. They are all greatly interested in socialized medicine and prepayment plans, in polio, cancer, and all other campaigns for better health.

It was necessary with the change of policy of your association to increase the dues. As you know, the dues of the State Medical Association were increased to $50.00. It was felt by your officers that this increase in dues might lose us quite a few members. We are glad to report, however, that to date this has not been the case. We believe that most of our members recognize the fact that if we are going to have an active, aggressive association we must have enough money to carry on the necessary work.

During the year, I have attended four meetings of the Council, all of which were held at Huron. I have attended one meeting of the House of Delegates, one meeting of the Committee on Pre-paid Medical Care and the annual North Central Conference in St. Paul in November. This meeting, while it was only a one-day meeting, was well worthwhile. The Minnesota Medical Association was the host. The program was well arranged and ably put on. Every possible courtesy was shown the visiting doctors. I am very glad to say that South Dakota had a splendid representation at the meetings.

Believing that some changes in the program at our annual meetings were advisable, I was very glad to accept the invitation of the Wisconsin State Medical Association to be their guest at their annual meeting in Milwaukee on October 7, 8, and 9. The meeting was well attended. They had an excellent program and many very fine exhibits. Our general program compares very favorably with theirs. The Wisconsin State Meeting puts on sectional programs, which they can do on account of their large membership. We believe that this is not practical for us in South Dakota as yet. To my mind, the outstanding feature of the whole program was their round table meetings held at the noon hour at the Schroeder Hotel. These meetings were presided over by members of the association and the discussion was led by outstanding speakers, such as Dr. Barker, Dr. Phemister, past president of the American Medical Association, and a number of others. At my suggestion, this is being carried out at our annual meeting this year. I believe that this is the first time that the South Dakota Medical Association has ever put on these round table conferences. We earnestly hope that this will be an annual affair. It is our opinion that it should be made a feature of our yearly meetings and should be one of the outstanding features of our program. At the annual banquet of the Wisconsin Association, Dr. Shoulders, president of the American Medical Association was the speaker. He presented the economics of medicine in a very able manner.

As this was the year for the meeting of the State Legislature, it was necessary for us to have more meetings of the Council than usual. At these meetings, proposed medical legislation was discussed and while some very dangerous bills were proposed, it is our judgment that, as a whole, the medical profession fared fairly well. So far as we know, there were no bills passed by the legislature that should be much of a menace either to the medical profession or the health of the people of South Dakota. This will be taken up in more detail in the report of the committee on Public Policy and Legislation.

I regret that owing to the great distances and the frequent meetings of the Council and other committee meetings, I have been unable to attend as many of the local society meetings as I should have liked to. I attended the meeting of the Yankton Society, District 8, at Yankton in September. This was a special meeting in honor of Dr. J. C. Ohlmacher. The meeting was well attended and was very well worthwhile. In April, I attended the regular meeting of the Sioux Falls Society, District No. 7. I have attended all the meetings of the Ninth district, the Black Hills Association.

In my annual address I shall speak in considerable detail about the medical and hospital situation in our state and also discuss the four year medical school. For that reason I am not touching on these important questions in this report to the House of Delegates.

I have spent much time and effort on the program for our 1947 session and feel certain that we have an outstanding program for your consideration.

F. S. Howe, M.D.

SECRETARY'S REPORT
1946-47

The employment of an Executive Secretary has lifted much of the burden from the Secretary-Treasurer, but there is still a great deal of work left for the office. The Officers and Council held four meetings during the year and the House of Delegates has a special session in January.

Your Secretary attended the A.M.A. convention in July and four conferences during the year. The North Central conference was held on November 10, 1946, in St. Paul and the South Dakota State Medical Association was represented by Drs. F. S. Howe, H. Russell Brown, Wm. Duncan, George Whitson, L. J. Pankow, R. G. Mayer, and Executive Secretary John C. Foster. Dr. Duncan was installed as President for 1947. Public relations, medial service, national legislation, prepayment medical care, industrial medicine, hospital survey and construction, and medical care of veterans were some of the subjects discussed at this conference.

On December 7 and 8 I attended the annual conference of secretaries and editors of state medical associtions held in Chicago. Executive Secretary John C. Foster also attended this conference. The activities of the A.M.A., state and county medical societies, radio programs, social security and federal income taxes, public relations, commercial exhibits, etc., were the subjects of the various speakers.

On February 7 and 8 I attended the second annual national conference on rural health in Chicago. Our Association was also represented by Executive Secretary John C. Foster, and Drs. A. P. Peeke, Volga, and M. M. Morissey, Pierre, members of our committee on rural medical service. It was well that we had a number of representatives present since the afternoon session was split up into six round table discussions in different rooms. Talks by A.M.A. officers and committeemen and representatives of the National Grange, Farm Bureau, Farm Union, co-operatives, etc., were heard. The problem of rural medical service is very important in South Dakota and the State Medical Association should co-operate with other groups in trying to solve the various problems.

On February 9 I attended the national conference on Medical Service in Chicago. Talks on legislation in Congress, care of veterans, medical co-operatives, council on medical service, medical education, general practitioners and specialization, etc., were heard.

In my report last year I suggested that a meeting of the district society officers be held. I renew the suggestions this year.

Our district societies are not as strong as they ought to be, and a fall or winter meeting of the district society officers with the officers and council of the state medical association should be of untold value both to the district societies and the state association.

Public relations of the medical profession is a subject that is discussed at practically every conference nowadays. The relations of the organized groups, the district societies, the state associations, the A.M.A. are important, but too many physicians do not seem to realize their individual responsibility for good public relations. As Raymond Rich has said: "Any physician who creates bad public relations for himself inevitably contributes to bad public relations for the entire profession." By strengthening our district societies and having them meet their local problems in a manner that will improve medical service in their own districts, and by stimulating every member to a realization of his own responsibility, we will do much to improve the public relations of the entire medical profession. This we must accomplish if we are to combat successfully the trend towards the socialization of medicine.

The analysis of the membership will be found in the report of the Executive Secretary.

R. G. MAYER, Secretary

TREASURER'S REPORT

1946-47

Part I—Secretary-Treasurer's Account

INCOME

Balance on hand, June 1, 1946		$5,061.64
Interest on U. S. Bonds	$ 25.00	
From Savings Account	293.19	
Interest Savings Account	1.46	
Dues—1946—6 members	90.00	
Dues—1947—25 members	1,250.00	
	$1,659.65	1,659.65
	Total	$6,721.29

DISBURSEMENTS

JOURNAL-LANCET (289 at $2.00)		$ 578.00	
Benevolent Fund		134.00	
Convention Expenses		499.78	
North Central Conference Dues		50.00	
Council Expenses		276.83	
Attorney — Retainer Fee		275.00	
Secretary's Salary		600.00	
Secretary's Office Expenses:			
Stenographer—Mimeograph	$120.00		
Bond	10.00		
Telephone & Telegrams	35.35		
Stationery and Postage	70.57		
Bank Charges	3.30		
Social Security Tax	6.00		
		245.22	
Secretary's Traveling Expenses ($200.00 1945-46)		289.36	
Executive Secretary's Office		3,061.08	
	Total	$6,009.27	
Balance on hand (Checking Account)		712.02	
	Total		$6,721.29

R. G. MAYER, M.D., Treasurer

Part II—Executive Secretary's Account

1946-47

INCOME

Income from Aberdeen account	$ 2,550.00	
Income from dues	12,405.00	
Income from exhibitors and bulletin	1,602.00	
Miscellaneous	13.60	
Total		$16,570.60

DISBURSEMENTS

Office expenses	$ 3,099.95	
Salaries	3,957.60	
Exec. Sec. Travel Expenses	1,443.56	
Expenses of Delegates and Councilors	902.11	
Legal expenses	370.91	
Total	$9,774.13	
Balance on hand	6,796.47	
Total		$16,570.60

Part III—Medical Service Account

INCOME

Payment from Veterans Administration	$26,334.90	
Loan from gen'l fund SDSMA	100.00	
Total		$26,434.90

EXPENDITURES

Paid to doctors for services	$22,318.00	
Salaries	1,057.14	
Office expenses	808.23	
Total	$24,183.37	
Balance on hand	2,251.53	
Total		$26,434.90

EXECUTIVE SECRETARY'S REPORT

1946-47

The office of the Executive Secretary for the South Dakota State Medical Association was opened September 1, 1946, although the Executive Secretary had been employed as of July 1. The major portion of the first three months was spent setting up the contract with the government on the Veterans Administration plan for home town care and securing adequate office space and personnel. Some time was also spent by the Executive Secretary in traveling to meet the various members of the district societies. After office space was secured September 1, the negotiations on the contract with the Veterans Administration were increased and on November 19, the final contract was approved by the Washington Veterans Administration and on December 15, the first veteran patient's records were processed through that office.

On January 13, the veterans care program was separated from the routine work of the office of the Executive Secretary and three clerks have been employed full time to handle the routine business regarding veterans care.

The executive office also carried on a drive to bring the membership rolls up to date and to enroll new members, and by May 1, 1947, we show a membership of 347. A monthly bulletin was started in December, 1946, to keep the members of the Medical Association informed of the activities of their home office. Six issues have been published since that time with a net expense to the Medical Association of about $82.00. The bulletin has been circulated to all members, some non-members, members of the Auxiliary, members of the State Hospital Association, other executive offices throughout the country, and to the persons who advertise in the bulletin, giving a monthly coverage of between 500 and 600 people. The executive office under the direction of the committee on pre-paid medicine assisted in the setting up, promotion, and selling of the South Dakota Injury-Illness Expense Plan. The Executive Secretary made a tour of the state in company of insurance officials, and at various times has spoken to groups who are interested in this type of pre-payment for medical expenses. The success of that program, of course, is recorded in the report of the committee in whose charge it has been.

In the field of public relations the executive office has maintained a close liaison with the Associated Press, United Press, and other news gathering agencies. The office arranged through the American Medical Association to originate part of a "Doctors Then and Now" broadcast in Sioux Falls. This portion of the program had been originally planned for Bismarck, North Dakota. As the medical profession in South Dakota increases its scope of activities, so will the field of public relations be enlarged and promotional materials be given to the new gathering agencies. Arrangements have been made with three of the most powerful radio stations in the state to give public service time to the South Dakota State Medical Association. The experiences of the executive office tend to indicate that public relations is chiefly a doctor-patient relationship.

The executive offices have also assisted a group of interested individuals in South Dakota in setting up the original plans for a State Mental Health Association, more of which will be heard in the very near future. The Executive Secretary has represented the South Dakota State Medical Association at the North Central Conference in St. Paul, a six-state conference in St. Paul on veterans problems, at the Michigan State Medical Society's annual meeting, at the conference of secretaries in Chicago, at the rural health meeting in Chicago, and will also represent the state of South Dakota at the executive conference at the American Medical Association's meeting in Atlantic City.

The executive secretary's office has been in constant contact with the public and finds a predominant feeling in favor of a four-year medical school. The greatest number feel that leadership should come from the medical association but are willing to start the drive if the medical association does not.

John C. Foster, Executive Secretary

A.M.A. DELEGATE'S REPORT TO THE COUNCIL 1946-47

The annual meeting of the A.M.A. House of Delegates was held in San Francisco, July, 1946.

Your delegate arrived in San Francisco early to attend on June 30th the second annual conference of presidents and other officers of state medical associations. This conference concerned itself mostly with the threat of political medicine and the development of prepaid medical care plans as a means of opposing the encroachment of socialization. Valuable discussions were participated in by excellent speakers well-versed in their subjects. The program included an address by Mr. Upton Close, world-famed analyst, writer, and radio commentator. He presented the view of his profession and the press generally concerning current trends in the economics of medicine. His address was very valuable and deserves considerable thought on the part of the medical profession.

The initial meeting of the House of Delegates convened on the morning of July 1st. There were present approximately 170 of the whole strength of 175. At each succeeding session approximately the same number was present. The attendance of medical men at the convention generally ran in the neighborhood of 8,000.

The distinguished Service Medal of 1946 was awarded to Dr. A. J. Carlson, professor emeritus of physiology at the University of Chicago. President Roger I. Lee gave a fine address before the house emphasizing that it is the younger members of the medical profession who will be most concerned with the changing order of medical practice. He asked that they be given a larger part to play in the affairs of the county and district medical societies, state medical associations, and the American Medical Association. The addresses of Dr. H. H. Shoulders of Nashville, Tenn., incoming president, and Dr. Olin West, new president-elect, were also well received.

The new officers were elected as follows: President, Dr. H. H. Shoulders of Nashville; president-elect, Dr. Olin West of Chicago; vice- president, Dr. Edward L. Bortz of Philadelphia; secretary, Dr. George Lull of Chicago. Dr. J. J. Moore of Chicago was re-elected treasurer. Dr. R. W. Fouts of Omaha was re-elected speaker and Dr. F. F. Borzell of Philadelphia as vice-speaker of the house of delegates. Dr. Charles W. Roberts of Atlanta was re-elected trustee.

In the meetings of the House of Delegates many important matters were brought up for consideration and many resolutions were passed. These you have undoubtedly read about in your medical journals so I won't go into that matter in this report. The most important matter considered at this session was the Rich report. During the past many months Raymond T. Rich and associates, public relations counsel of New York, have made an exhaustive study of A.M.A. public relations, technics, and policies. Following this study they made a 60-page report to the Board of Trustees. The contents of this report were not revealed by the Board of Trustees to the House of Delegates except fo ra small portion. The reason for this as given by the board was that the report was extremely confidential and should be known to the fewest number of people, and further, that they had not had time to digest the report in full. The Board of Trustees asked the House of Delegates to empower them to proceed along three major channels as advised by the report. Direction to do this was given to the Board of Trustees by the House of Delegates.

The report advised that the A.M.A. activities should be divided into three general classifications. The first channel of activity should be that of scientific work. This division would be under the supervision of Dr. Fishbein. The report advised a considerably expanded program of public education and an attempt to modernize and improve the magazine, *Hygeia*, in order to make it a more effective medium of health education for the public.

The second major proposal was to reinvigorate and further develop the Bureau of Medical Economics by the engagement of an eminent lay-economist to direct its activities. Employment of first class professional economists of standing and reputation in that field and their concentrated work on the subject of medical economics should greatly enhance the influence of the A.M.A. in future presentations before legislative committees and lay organizations generally.

The third general recommendation of the Rich report as approved by the House of Delegates was to coordinate the public relations aspects and functions of all agencies of the A.M.A. through an executive assistant to be directly responsible to the secretary and general manager. He and his staff are to have charge of all public relations matters of the A.M.A. They are to interpret the activities of the association to the public generally.

After the constructive action as described above had been taken, the old fight of several years standing against Dr. Fishbein subsided. It appeared that the aggressive and progressive elements within the A.M.A. were satisfied that at last something tangible was to be attempted and accomplished in this regard by the organization. The entire matter is now in the hands of the Board of Trustees for further accomplishment. Results to be appreciated from this action are dependent now upon the will of the Board of Trustees to accomplish these objectives and their ability to hire adequate personnel to do the job.

Two other resolutions among the many that were presented and passed should be mentioned here. A resolution was unanimously adopted opposing the Wagner-Murray-Dingell bill. Another resolution was adopted providing for two meetings of the House of Delegates each year. From now on, there is to be a mid-year meeting of the House of Delegates at the A.M.A. headquarters in Chicago during December. It was definitely felt that the problems of medicine could not be handled successfully by the House of Delegates in one single annual meeting.

It was a pleasure for me to attend the annual meeting as your delegate. The almost full attendance at each session bespeaks the interest of the delegates in the problems of organized medicine. It is fortunate that such interest exists because the problems to be considered at such meetings are of extreme and vital importance, not only to the medical profession, but to the people of the nation generally.

December 1946 Session of House of Delegates of A.M.A.

On December 9 to 11, 1946, the House of Delegates of the American Medical Association held its first mid-term meeting in Chicago. The practice of holding two meetings a year was deemed a necessity at the annual meeting in July, 1946, in San Francisco. Demonstrating the need for two meetings, it is interesting to observe that the routine business transacted at this meeting occupied almost three days of intensive effort.

A considerable number of resolutions previously published in the *Journal* of the A.M.A. received consideration. Included were initial steps taken toward providing representation in the House of Delegates for the Medical Corps of the Veterans Administration. Recommendation that an American Board of General Practice be established was referred to the Section on General Practice for study and report at the next meeting.

Much routine business was transacted in connection with the coming centennial meeting at Atlantic City this year. A general revision and modernization of the constitution and by-laws was the subject of a detailed report by a special committee. Without doubt the revision will be completed and approved at the next meeting.

Consideration of the Rich report was the subject for an executive session of many hours duration. Because this report was not released to the delegates at San Francisco, the House appointed a committee to study it, and then bring its recommendations as well as the Rich report itself.

Because this report is copyrighted by the A.M.A., and all discussion of the matter was confined to executive session, it cannot be commented upon. However, medical journals are to receive for publication a full statement in this regard with A.M.A. sanction very shortly.

Some of the Rich recommendations, as authorized by the House of Delegates at San Francisco, have been put into effect. As already published, an outstanding economist has been employed as head of the Bureau of Medical Economic Research. A public relations counsel has been employed to serve as administrative assistant to George F. Lull, secretary and general manager of the A.M.A. The Council on Medical Service and Public Relations has had its name and functions curtailed, and from now on, is the Council on Medical Service.

In a general way, it was of interest to note that A.M.A. memberships, and particularly A.M.A. fellowships, had increased markedly in number during the past year. Attendance at this House of Delegates meeting was up to its usual high standard, there being 167 out of a possible 175 present. Again I wish to express my appreciation for the confidence of this body in permitting me to represent the South Dakota State Medical Association.

H. RUSSELL BROWN, M.D.,
Alternate Delegate to A.M.A.

PROCEEDINGS OF THE 66TH ANNUAL MEETING OF THE HOUSE OF DELEGATES

South Dakota State Medical Association

First Session, June 1, 1947

The first meeting of the House of Delegates was called to order at 1:40 P.M. on June 1, 1947, in the City Auditorium, Rapid City, by the president, Dr. F. S. Howe, Deadwood. The roll was called by the secretary, Dr. R. G. Mayer, Aberdeen; the following being present: President, F. S. Howe, Deadwood; president-elect, H. Russell Brown, Watertown; vice president, J. L. Calene, Aberdeen; secretary-treasurer, R. G. Mayer, Aberdeen; executive secretary, John C. Foster, Sioux Falls; councilors M. W. Larsen, Watertown; C. E. Robbins, Pierre; Wm. Saxton, Huron; J. H. Lloyd, Mitchell; L. J. Pankow, Sioux Falls; E. M. Stansbury, Vermillion; R. E. Jernstrom, Rapid City; R. J. Quinn, Burke; A. W. Spiry, Mobridge; Wm. Duncan, Webster; delegates, Leo Graff, Britton, and J. A. Eckrich, Aberdeen, First district; H. T. Kenney, Watertown, Second district; E. S. Watson, Brookings, Third district; M. M. Morrissey, Pierre, Fourth district; H. L. Saylor, Huron, Fifth district; Wm. Ball, Mitchell, Sixth district; George Stevens, Sioux Falls, J. A. Kittelson, Sioux Falls, Seventh district; V. I. Lacey, Yankton, and J. C. Ohlmacher, Vermillion, Eighth district; Lyle Hare, Spearfish, W. L. Meyer, Sanator, H. E. Davidson, Lead, Ninth district; W. H. Karlins, Webster, F. T. Younker, Sisseton, Twelfth district.

Dr. Pankow moved that since the minutes of the last annual session were printed in the JOURNAL-LANCET the reading of the minutes be dispensed with. The motion was seconded by Dr. Calene and carried. The minutes of the special meeting of the House of Delegates held at Huron, January 26, 1947, were read by the secretary and approved. President Howe appointed the following committees: Committee on Reports of Officers—H. T. Kenney, Watertown; George Stevens, Sioux Falls; W. A. Dawley, Rapid City; Committee on Resolutions and Memorials—Wm. Duncan, Webster; R. J. Quinn, Burke; W. L. Meyer, Sanator; Committee on Nominations—Chairman, R. J. Quinn, Burke, Tenth district; J. A. Eckrich, Aberdeen, First district; H. T. Kenney, Watertown, Second district; E. S. Watson, Brookings, Third district; M. M. Morrissey, Pierre, Fourth district; H. L. Saylor, Huron, Fifth district; J. H. Lloyd, Mitchell, Sixth district; J. A. Kittelson, Sioux Falls, Seventh district; J. C. Ohlmacher, Vermillion, Eighth district; Lyle Hare, Spearfish, Ninth district; A. W. Spiry, Mobridge, Eleventh district; W. H. Karlins, Webster, Twelfth district; Committee on Credentials—W. L. Meyer, Sanator; C. J. McDonald, Sioux Falls; E. M. Stansbury, Vermillion; Committee on Amendments to Constitution and By-Laws—R. G. Mayer, Aberdeen; William Duncan, Webster; William Saxton, Huron.

Reports of officers followed, these being given by President F. S. Howe, President-elect H. Russell Brown, Vice-President J. L. Calene, Secretary-Treasurer R. G. Mayer; Executive Secretary John C. Foster, Chairman of the Council C. E. Robbins, and brief reports from the councilor of each district. Dr. H. Russell Brown presented his report as delegate to the American Medical Association of the meetings held at San Francisco and Chicago.

Dr. R. D. Green, of the Veterans Administration in Sioux Falls, gave a talk on the set-up here in South Dakota and explained the various problems that have come up in the past months of operation. His talk was followed by questions and general discussion.

Reports of standing and special committees followed. The secretary read a letter from the Naval Air Command telling of the openings in Naval Air Service for doctors. Karl Goldsmith discussed the Farmers Aid Corporation Fund and presented a resolution waiving the rights of the individual physicians in the fund to the State Medical Association. A motion was made by Dr. Stansbury, seconded by Dr. Lloyd, and carried to adopt the resolution. Dr. Pankow explained his amendment to the constitution and by-laws to take care of the filling of absences of councilors at meetings. A motion was made by Dr. Saxton, seconded by Dr. Stansbury, and carried that the amendment be adopted. A motion was made by Dr. Pankow, seconded by Dr. Lloyd, and carried, that Dr. E. A. Pittenger be elected alternate councilor to represent the First district.

A motion was made by Dr. Pankow that the incoming president appoint a committee of three, of which the president shall be one, to make an intensive study of the constitution and by-laws, and revise them and to present their report at the next annual meeting of this Association, and that the Council be present at all of the meetings of this committee. The motion was seconded by Dr. Robbins and carried. The report of the Committee on Auditing and Appropriations, including the budget for the coming year, was given by the chairman of the committee, Dr. Saxton, and he moved the adoption of the report. The motion was seconded by Dr. Stansbury and carried.

A motion was made by Dr. Pankow that the Association go on record as endorsing the work of those other organizations which are trying to eradicate Bang's disease or undulant fever, and that a copy of our endorsement be sent to the veterinarians association through its secretary, and any other organizations that we may find are attempting to control and eradicate the disease. The motion was seconded by Dr. Stansbury and carried.

A motion was made by Dr. Morrissey that Dr. F. A. Northrup and Dr. Olin A. Kimble be accepted as honorary members of the Association. The motion was seconded by Dr. Pankow and carried. A motion was made by Dr. Saxton, seconded by Dr. Robbins and carried that Dr. H. L. Saylor and Dr. O. R. Wright be accepted as honorary members of the Association from the Huron district. On motion the meeting adjourned at 5:45 P.M.

Second Session, June 2, 1947

The second session of the House of Delegates was called to order at 5:00 P.M. by the president, F. S. Howe, Deadwood. On roll-call the following were present: Drs. Howe, Brown, Calene, Mayer, Foster, Larsen, Robbins, Saxton, Lloyd, Pankow, Stansbury, Quinn, Spiry, Eckrich, Kenney, Watson, Davidson, Stevens, Kittelson, Kemper, Hare, Mayer, Lande, Totten, Karlins, Younker. A motion was made by Dr. Stevens, seconded by Dr. Watson and carried that the reading of the minutes of the previous session be dispensed with.

The report of the Committee on Credentials was given by Dr. Mayer. The report of the Committee on Nominations was read by Dr. Quinn. Drs. J. L. Calene, Aberdeen, and F. S. Howe, Deadwood, were nominated as president-elect. Dr. Howe withdrew, and a motion was made by Dr. Karlins, seconded by Dr. Stansbury, and carried, to close nominations and have the secretary cast a unanimous ballot for Dr. Calene as president-elect. Drs. Wm. Saxton, Huron, and C. E. Robbins of Pierre, were nominated as vice-president. Dr. Robbins moved that his name be withdrawn. The motion was seconded by Dr. Lloyd and carried. A motion was made by Dr. Stansbury, seconded by Dr. Stevens and carried, that nominations be closed and that the secretary cast a unanimous ballot for Dr. Wm. Saxton as vice-president.

Both Sioux Falls and Watertown extended official invitations to the Association to hold the next annual convention in their respective cities. A motion was made by Dr. H. T. Kenney, Watertown, to withdraw the invitation of Watertown in favor of Sioux Falls. The motion was seconded by Dr. Pankow and carried. A motion was made by Dr. Pankow, seconded by Dr. Kenney, and carried, that the next annual meeting be held in Sioux Falls.

The report of the Committee on Amendments to the Constitution and By-Laws was read by Dr. Mayer. Dr. Pankow moved that the report be accepted, and action be taken on the same. The motion was seconded by Dr. Stansbury and carried. The report of the Committee on Reports of Officers was given by Dr. Kenney, and, on motion, adopted. The report of the Committee on Resolutions and Memorials was read by Dr. Mayer. Dr. Mayer moved that the benevolent fund be built up to be of some value or dispensed with. Dr. Pankow seconded the motion and it was carried. The Committee on Prepaid Insurance and our medical plan was reported by Dr. Mayer. Dr. Mayer moved that Dr. Brown be thanked for his efforts in this insurance plan and that the delegates do their utmost to further the success of this plan. The motion was seconded by Dr. Kittelson and carried. A motion was made by Dr. Robbins, seconded by Dr. Stansbury and carried that Dr. Brown continue in his capacity as chairman of the Committee on Prepayment and Insurance Plans. The report of the Sub-committee on Tuberculosis was given by Dr. Mayer. Dr. Lloyd moved that the report be accepted and the motion was seconded by Dr. Stansbury and carried.

Dr. F. S. Howe gave his presidential address. A motion was made by Dr. Stansbury that a committee be appointed to investigate all the facts pertaining to the establishment of a four-year medical school, with Dr. Slaughter as chairman of the committee. Dr. Mayer seconded the motion. Dr. Pankow moved to amend this motion to read that Dr. Slaughter not be on the committee. Dr. Pankow's motion was lost for lack of a second, and the original motion was carried. Dr. Pankow moved that the House of Delegates reaffirm and endorse the repeated action of the Council that we favor a four-year Class A medical school with an adequate appropriation. The motion was seconded by Dr. Calene and carried. Dr. Stansbury talked on the need for more nursing education. He moved that a committee be appointed to investigate the proper ways and means of getting more girls into training. The motion was seconded by Dr. Stevens and carried.

Dr. Pankow moved that the dues be fixed at $50.00 per annum. Dr. Kemper seconded this motion and it was carried. Dr. Howe thanked every member of the House of Delegates for their splendid cooperation during the preceding year. On motion the meeting adjourned at 6:30 P.M.

R. G. Mayer, M.D., Secretary

CHAIRMAN OF COUNCIL'S REPORT TO HOUSE OF DELEGATES

The first Council meeting of the year was held on August 18, 1946, in Huron. At the request of Dr. E. W. Hewlett, secretary-treasurer of the South Dakota Society of Osteopathic Physicians and Surgeons, a sub-committee of the Council of the South Dakota State Medical Association, consisting of Drs. L. J. Pankow and C. E. Sherwood and Mr. Karl Goldsmith, met with their legislative committee. Dues for full-time municipal, state, or federal employees, not engaged in private practice, set at one-half the regular dues, or $25.00. The proposed contract and fee schedule between the Veterans Administration and the South Dakota State Medical Association was considered and adopted. The Committee on Prepayment and Insurance Plans reported progress in formulating an insurance policy for illness and injury with the St. Paul Mercury & Indemnity Company of St. Paul, Minnesota. Various legislative problems were considered.

The second meeting was held on November 24, 1946, in Huron. The Council does not approve the proposed bill to allow osteopaths the right to unlimited practice in South Dakota. The Basic Science Law, including the annual registration fee of $2.00 was approved. The Committees on Prepayment and Insurance Plans presented reports on progress of plans. The Council approved the four-year medical school plan, as presented by Dean Donald Slaughter.

The third meeting was held on January 12, 1947, in Huron. The Council approved the legislative bill increasing the salary of the superintendent of the State Board of Health. The report of the Committee on Prepayment and Insurance Plans was adopted and the Council authorized the calling of a special meeting of the House of Delegates by the president to consider the plan. The Council went on record as opposing the osteopathic bill allowing osteopaths to do major surgery. A special sub-committee on legislation consisting of Drs. C. E. Robbins, J. D. Alway, Wm. Saxton and C. E. Sherwood was appointed.

The fourth meeting was held on January 26, 1947, in Huron. It consisted of routine business and was reported in the February issue of "Your Medical Association."

C. E. Robbins, M.D.,
Chairman of the Council

Report of Committee on Auditing and Appropriations

The Committee on Auditing and Appropriations met on May 31, 1947, and found the books and accounts of the treasurer and executive secretary correct. The following budget was adopted and is presented for approval:

Estimated income, all sources	$15,000.00
ESTIMATED DISBURSEMENTS	
Secretary's office	$1,200.00
Attorney's retainer	300.00
Journal-Lancet	700.00
Council expenses	400.00
Benevolent Fund	175.00
North Central Conference	50.00
Annual Meeting	1,000.00
Travel expenses, Executive Secretary	1,500.00
Executive office expenses	2,820.00
Miscellaneous	500.00
Executive Secretary's salary	6,000.00
Total	$14,645.00

W. H. Saxton, M.D.
R. J. Quinn, M.D.
R. E. Jernstrom, M.D.

Report of Committee on Credentials

The Committee on Credentials makes the following report:

1. Number of officers present—4
2. Delegate to A.M.A. present
3. Alternate delegate to A.M.A. present
4. All councilors present except District No. 3, and all districts represented.
5. Councilor at large present
6. Number of delegates present—16
7. Total number of members registered by 4 P.M. June 3rd—122
8. Number of guests present—62
9. Women's Auxiliary—72

W. L. Meyer, M.D.
E. M. Stansbury, M.D.
C. J. McDonald, M.D.

Committee on Reports of Officers

The Committee on Reports of Officers commends them for the excellent work they have done in the past year and accepts their reports as given.

H. T. Kenney, M.D.

Committee on Resolutions and Memorials

This committee wishes to move the adoption of these reports with the exception of the following:

Sub-committee on Benevolent Fund. Be it recommended that the benevolent fund be built up to a substantial amount whereby it would, through its earning power, amount to enough to be of material value for the relief of needy physicians or their dependents, or that some other dispositions be made of this fund.

Committee on Prepayment and Insurance Medical Plan. Appreciating the effort that Dr. Brown has put forth preparing this report, we wish to move that this society thank Dr. Brown for his efforts, and that each of us do our utmost to further the success of this plan.

Sub-Committee on Tuberculosis. It is the opinion of this committee that every patient has the right to feel that he is being cared for in a fire-proof structure. We believe that it should be the duty of every member of this Association to impress on the members of the legislature that the lack of fireproof structures at the State Sanatorium should be corrected as soon as possible. Dr. Meyer will be pleased to present a paper on tuberculosis at each or any district society meetings during the year and we urge that this invitation be accepted.

Wm. Duncan, M.D.
R. J. Quinn, M.D.
W. L. Meyer, M.D.

REPORTS OF STANDING COMMITTEES

Committee on Public Policy and Legislation

Your Committee on Public Policy and Legislation begs to report the following: The following bills passed both houses and were signed by the Governor.

Senate Bill 27 authorizes counties to render financial aid to cities for the construction of public hospitals. This provided that when a city within a county has no hospital having a capacity of not less than twenty patients, the county commissioners may aid the city in paying the cost of the erection of a hospital to the extent of not more than 50 per cent of the cost. There are certain restrictions, for which reference should be made to the specific bill.

Senate Bill 28 authorizes cities to establish and maintain hospitals.

Senate Bill 184 regulates the sale of barbiturates.

House Bill 18 provides for the licensing of chiropractic hospitals by the State Board of Chiropractic Examiners. As finally passed by both houses, it was amended so that it provides that such hospitals may be periodically inspected by the State Board of Health as to sanitary measures and further provides that the Chiropractic Board can issue licenses when approved by the State Board of Health.

House Bill 50 provides for any inventory of existing hospitals by the State Board of Health, and for accepting the benefit of the Federal Hospital Survey and Construction Act.

House Bill 198 amends the present Blue Cross Hospital bill and makes it more workable.

House Bill 302 amends the present Basic Science Law, so that anyone who served as a medical officer in World War II shall be exempt from taking the examination.

Senate Bill 193 was introduced, which provided that one of the members of the State Board of Health should be a chiropractor. This bill died in the senate committee on public health.

There was no bill introduced authorizing osteopaths to practice surgery, nor was the contemplated amendment to the Basic Science Bill offered.

On the whole, the medical profession fared fairly well in the last legislation.

F. S. Howe, M.D.
H. R. Brown, M.D.

Committee on Publications

The contract with the Journal-Lancet as official publication of the South Dakota State Medical Association still has one year to run. The suggestion made by this committee last year that a monthly bulletin be published by the association, was carried out. The first issue of "This Is Your Medical Association," with the executive secretary, John C. Foster, as editor, was published in December. This has been of much benefit in bringing pertinent information to the members.

R. G. Mayer, M.D.

Committee on Medical Education and Hospitals

Your committee respectfully submits this report on medical education and hospitals and particularly wishes to point out the following points:

1. The failure of the legislature to appropriate money for the four-year medical school was largely due to inadequate lobbying for the school at the proper time.

2. The appropriation asked for was very inadequate. If a four-year school is to be projected at the last term of the legislature it will cost quite a lot of money. In our opinion it will take an appropriation of between one and two million dollars and maintenance of the school would take at least $600,000 a year. It is up to the State Medical Association largely, whether they wish to try again for a four-year school.

The favorable progress of the hospitals in the state is commendable. The advent of some top notch pathologist work done in some of the larger centers makes 24-hour pathologist service available to all hospitals in the state and they should use this service.

Hospital facilities are still at a premium but there are definite signs of new hospitals being built throughout the state and additions to existing hospitals, which we believe will eventually take care of the situation.

Geoffrey Cottam, M.D.
John L. Calene, M.D.
T. F. Riggs, M.D.

Committee on Public Health

Sub-Committee on Tuberculosis

The members of the Sub-Committee of the South Dakota State Medical Association wish to submit the following report:

The main point of interest that should be discussed at this time is the operation of the two mobile X-ray units that are maintained by the State Board of Health. You will recall that the first unit was placed in operation at the time of the state medical meeting in Aberdeen last year. Following the close of the state meeting the unit remained in Aberdeen for several months. A large number of people in that immediate area availed themselves of the opportunity of securing a chest X-ray. The follow-up of suspicious cases was carried out with the cooperation of the local physicians. Figures are not on hand at this time to state the number of individuals that showed various types of pathology. Suffice to say that a considerable number of children were found with primary tuberculosis infections. This indicates that someone in that locality has had an active infection and has been spreading the infection to the remaining population. A fair number of cases of active secondary tuberculosis was discovered. Some of these have been admitted to the sanatorium.

Other types of non-tuberculous pathology have been reported to the physicians. In some cases these will have no significance. In other cases they were of a type that should demand immediate investigation. A surprisingly large number of cervical ribs were discovered. While this may not be of significance, the knowledge of the presence of such a condition may be of significance in case these individuals complain of unexplained pain in the arm. Chest tumors, those that were definitely benign and those that appeared to be malignant were reported. Reporting any pathology ha been the policy of the interpreter of the films during the entire course of the survey.

Following the completion of the survey at Aberdeen, the unit moved to Huron, then Brookings, then Madison. It was joined at Pierre the first part of the year by the companion trailer unit; the two units are at this time covering areas supplementing each other. The portable unit moved to a central location. It remains in this location for the duration of the survey. The companion trailer unit moves about to various locations in the area securing X-rays on individuals unable to go to the location of the other unit. In this manner a larger coverage can be secured and a larger number of persons will secure X-rays while the units are available. At this time both units are in Rapid City. It is probable that they will be in Custer county by the first of May.

The two units together have taken a total of over 40,000 plates from the time they were started in June of 1946. It must be remembered that this was the first year of the survey. Policies regarding procedure had not been established. Only one unit was in operation a large portion of the time. Advance publicity had not been well worked out. It is to be hoped that this will be more effective during the next year. It is also to be hoped that a more effective follow-up program can be developed, so that individuals who show suspicious chests can be checked up on if they do not report for their follow-up examination.

A large number of individuals with definite calcification and enlarged hilar areas have shown negative tests if the test used is the first strength tuberculin or the Patch test. It will be very rare to find an individual with calcification in the hilar area and enlargement in that region that has not had at least a primary tuberculous infection. It must be therefore recommended that very little reliability be placed on such an examination. A 14x17 X-ray should be secured by all means.

Perhaps for the edification of the South Dakota State Medical Association some mention should be made of the status of the various drugs that have been proposed for the treatment of tuberculosis. At the present time they all fall about in the same category. It does seem that streptomycin has perhaps some slight advantage over the others. However, this is still in the experimental stage and its value has not been determined. In some types of cases it has been of some value. It will decrease the rate of activity of the tubercle bacillus, however it will not kill the tubercle bacillus in the human organism, unless used in very large dosages and in such instances it proves too toxic. It does in some instances slow the activity of the tubercle bacillus to such an extent that the individual is able to care for the infection. At the present time it still costs about $4.40 per gram with a total of about 200 grams being required. The cost is almost prohibitive and only a few private cases would purchase the drug themselves.

The last session of the legislature appropriated $250,000 to develop a water supply at the sanatorium. This is sorely needed and the amount of money should suffice. $150,000 was also appropriated to be used with later appropriations to build fire resistant buildings for the patients. At the present time there is no fire resistant building for the housing of any patient. Such a condition is deplorable and should be corrected at the earliest available moment. It is hoped that the next session of the legislature will appropriate sufficient additional funds to permit the development of the recommended program.

W. L. Meyer, M.D.
D. S. Baughman, M.D.
E. M. Stansbury, M.D.

Sub-Committee on Cancer

This committee, as such has not held official meetings, but the individuals have worked on this project in their own fields of endeavor. Dr. Cottam will make an individual report on cancer from the standpoint of the State Board of Health.

During this year the South Dakota Cancer Commission has been formed, the members of which are composed of laymen and members of the profession, and members representing the American Cancer Society in this state. The physicians representing the medical society have already been approved by the Council of the South Dakota State Medical Association. In formulating this commission, the state has been divided into districts. Physicians and laymen have been chosen from each district. For the most part, physicians have been chosen for their intense work in cancer. The laymen were chosen because of their interest in the American Cancer Society. Dr. Gilbert Cottam represents the State Board of Health on the commission. Dr. Paul McCarthy represents the Aberdeen district, Dr. E. H. Brock the Black Hills district, Dr. Hans Jacoby the Huron district, Dr. William Duncan, the Watertown district, Dr. D. H. Breit the Sioux Falls district. The Cancer Committee of the State Medical Association is represented by myself as executive director. This commission has been incorporated according to the state laws of South Dakota and will foster the activities of the American Cancer Society.

The cancer education work was spread throughout this state by Mrs. Harry Dory, who is state commander of the Field Army. This program has been as follows:

School program: Organized counties are using the school programs in high schools. This consists of a text book for students, *Cancer—a Challenge to Youth*, and a manual for teachers to prepare themselves for the course. This course can be taught in biology, zoology, health and science high school classes, and is a one, two or three day course—whatever time the teacher will give to it. All the materials are furnished by the society, but schools are asked to retain the textbooks for next year's teaching.

The club program for society's study clubs, extension clubs, etc., is a fully prepared quiz paper of 15 minutes length. A leader asks the questions and four others participate in the answers. With this we have used a quiz on cancer put up in true-false form for each individual to test his own knowledge of cancer. This program has been very popular, and plans are now in progress for a new club program for next year. The sound movies, of which we have three different ones, touch on fear of cancer, quackery, and the positive and negative side of cancer treatment. There is also one silent film on the uses of treatment methods. These films have proved very successful and have traveled the state.

The various pamphlets that have been distributed are "Cancer of the Breast," "Cancer of the Digestive Tract," "Cancer of the Rectum," "Cancer Facts for Men and Women," "Danger Signals," "Who, What, Why and Where of Cancer."

Cancer News touches on cancer from every angle, as well as state and national news.

Plans in progress now are a library program whereby we will have a compilation of our larger pieces under one cover, such as Dr. C. C. Little's *Cancer for Laymen*, etc. It seems that should someone go to the library asking for information on cancer, at present, they have nothing to give them.

The campaign for funds for the American Cancer Society is now being concluded. The goal for the state is $26,000, and $20,000 has been contributed. Sixty per cent of this stays in the state of South Dakota.

During the year the expenses for forty physicians were sponsored by this society for a cancer course given at the University of Minnesota. If plans can be formulated at least this number will be invited to attend a similar course, if the physicians in this state wish to go.

It is hoped that the organization that we now have will be able to function in a worth-while manner and will have the backing of the physicians of this state, and that we will be able to meet the challenge of cancer in a more orderly manner in the years to come.

It is hoped that at least four cancer clinics will be established in the various parts of the state this next year. There certainly should be adequate facilities for these in Aberdeen, Huron, Rapid City, Sioux Falls, Watertown, and Mitchell.

O. S. Randall, M.D.

As a member of the sub-committee on cancer, I wish to report that the position of the State Board of Health continues, as heretofore, to stress the educational side of cancer control through its publications and talks to groups where the opportunity presents. We do not have enough money to establish and maintain an independent cancer control center nor do we think that such an activity would be advisable. It would be impossible for us to secure the high grade of professional personnel that would be adequate for such an important undertaking and the response on the part of the public would not warrant it. If the medical department of the state university continues to develop, we feel that it would be the logical place for cancer control activities. Our educational program has been greatly augmented by the work of the South Dakota Field Army of the American Cancer Society and of the State Commission on Cancer Control.

Gilbert Cottam, M.D.

Sub-Committee on Syphilis Control Program

As chairman of the sub-committee on Syphilis Control Program, I wish to report that we are continuing in the State Board of Health the same procedures as those we followed last year; of authorizing the hospitalization of suitable syphilitic patients for rapid treatment, in paying bills, and also issuing penicillin without charge to physicians, at their request, for use in such authorized cases in their practice.

Gilbert Cottam, M.D.

Sub-Committee on Mental Health and Child Welfare

I have been personally interested for some time in two projects which I feel would be of some benefit to this community. These have been discussed to some extent with the local groups and have received favorable reaction. I have also made other contacts and have received no opposition.

The first of these is the matter of attempting to procure a neuropsychiatrist for the West River district. Local organizations, or their representatives, interested in this endeavor in addition to the medical profession are the local health unit, the speech correctionist, the child welfare, the local juvenile judge, and the local superintendent of schools. I have also contacted the State Board of Health and find them interested.

The second matter regards legislation probably in the nature of an enabling act which would permit requiring vaccination for smallpox and immunization for diphtheria for admission to public schools. It is my understanding that under present state laws no community could enact such requirements if they desired. There is perhaps enough favorable opinion locally so that this might be accomplished, if such a law were enacted.

J. D. Bailey, M.D.

Committee on Necrology

Doctors deceased—June 1, 1946, to June 1, 1947:
J. E. Shull, Alpena—July 12, 1946.
J. G. Chichester, Redfield—September 5, 1946.
F. M. Loring, Howard—September 6, 1946.

E. S. Stenberg, Sioux Falls—October 31, 1946.
H. A. Miller, Brookings—November 14, 1946.
R. G. Stevens, Sioux Falls—February 22, 1947.
J. O. Lee, Sioux Falls—February 28, 1947.
H. H. Lockwood, Henry—March 14, 1947.
O. L. Hanson, Valley Springs—May 25, 1947.

MAGNI DAVIDSON, M.D.
W. G. MAGEE, M.D.
R. A. WEBER, M.D.

Committee on Medical Benevolence

Cash on hand in savings account June 10, 1946		$438.97
6/10 Mitchell District Auxiliary		5.00
6/29 Interest		1.53
6/10 S.D.S.M.A., 50c per capita		134.00
12/31 Interest		3.85
2/10/47 Black Hills District Auxiliary		5.25
3/31/47 Interest		2.19
	Total	$590.79
4/12/47 Purchase of $700 Series F Bonds	$518.00	
4/26/47 Balance cash on hand	72.79	

Number	Maturity Value	Cost	Date Purchased	Present Value
1	$ 500.00	$ 370.00	April, 1947	$ 370.00
2	200.00	148.00	April, 1947	148.00
3	75.00	55.50	April, 1943	57.51
1	100.00	74.00	April, 1943	76.70
1	500.00	370.00	April, 1943	385.50
1	1,000.00	740.00	April, 1943	767.00
1	100.00	74.00	October, 1943	76.00
1	25.00	18.50	October, 1944	18.50
2	50.00	37.00	October, 1942	38.80
13	$2,450.00	$1,887.00		$1,936.36

Total Resources—$2,009.36

The preceding report is a statement of the financial condition of the benevolent fund as of April 25, 1947. The last three bond items, representing a cash outlay of $129.50, are bonds purchased by the State Auxiliary from excess funds in their treasury and voted to the benevolent fund last spring. As you will notice, practically the entire receipts of this fund for the past year other than this have come from the 50c per capita support of the Medical Association. The balance is made up of interest on funds in the bank and $10.25 from the district auxiliaries. It would seem that the individual members of the Auxiliary, whose idea this fund was, have lost interest. Your committee can still remember, in these days of high income, the years—not so long past—when there were physicians and their families in this state who could have used a little financial lift and it is our belief that in the future—and we are afraid not too distant—that this will be the case again. It is our recommendation that the Auxiliary, as well as the Medical Association, get squarely behind this fund and build it up to at least $5,000 within the next year or two—while incomes are good. Obviously, if principal is used for relief it will soon be gone and principal must be at least $5,000 to bring income up sufficiently to be of any help.

It has been rumored that many of the Auxiliary members felt that there is no one now in need and that the funds collected should be used for loans or grants to medical or nursing students. As the enabling acts for this fund now read, funds could not be so used. For these purposes, both the Auxiliary and the Medical Association would have to amend the set-up of the committee.

A meeting of the joint committee was held in Huron on February 16, at which time this matter was discussed. It was decided to refer it back to the two associations for their action. The secretary was authorized to buy bonds with the cash balance and this was done.

C. E. SHERWOOD, M.D.

Committee on Scientific Work

Your committee respectfully submits to the House of Delegates the following scientific program of the 1947 annual session for your approval.

F. S. HOWE, M.D.
H. R. BROWN, M.D.
R. G. MAYER, M.D.

SCIENTIFIC PROGRAM

MONDAY MORNING, JUNE 2, 1947

Presiding Officer: F. S. Howe, M.D., President

8:45 A.M. Preview of exhibits.

9:30 Climate as a Major Factor in the Degenerative Metabolic Diseases—Clarence A. Mills, M.D., Professor of Experimental Medicine, University of Cincinnati.

10:00 Replacement of Fluid Losses Associated with Operation and Trauma—Frederick A. Coller, M.D., Chief, Department of Surgery, University of Michigan.

10:30 Recess to view exhibits.

11:00 Continuous Follow-up Study of Arthritics—H. Archibald Nissen, M.D., Boston, Massachusetts.

11:30 Carcinoma of the Lung—Alton Ochsner, Chief, Department of Surgery, Tulane University, New Orleans, Louisiana.

12:15 Luncheon Meetings.

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MONDAY AFTERNOON, JUNE 2, 1947

Presiding Officer: William Donahoe, M.D.

2:00 P.M. Some Clinical Aspects of Poliomyelitis—John A. Anderson, M.D., Department of Pediatrics, University of Utah, Salt Lake City, Utah.

2:30 Treatment of Some of the Common Skin Diseases—Helen Jane Hare, M.D., Department of Dermatology, Mayo Clinic.

3:15 Recess to view exhibits.

3:45 Clinical Talk on Stumbling Blocks in Fracture Work—F. E. Clough, M.D., Orthopedic Consultant, San Bernardino, California.

4:30 Treatment of Extra-ocular Injuries—Edward P. Burch, M.D., Associate Professor of Ophthalmology, University of Minnesota.

5:00 House of Delegates meeting.

7:00 Annual Banquet. Speaker: J. S. Jones, Executive Secretary, Minnesota Farm Bureau Federation. Subject: Rural Health.

9:00 Council meeting.

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TUESDAY MORNING, JUNE 3, 1947

Presiding Officer, G. T. Jordan, M.D., Vermillion

8:00 A.M. Council meeting.

8:45 View exhibits.

9:30 Routine Studies and the Non-articular Aspect of the Arthritic—H. Archibald Nissen, M.D., Boston.

10:00 Radiology—Earl Barth, M.D., Department of Radiology, Northwestern University.

10:30 Recess to view exhibits.

11:00 The Treatment of Severe Asthma—C. K. Maytum, M.D., Consultant in Medicine, Mayo Clinic.

11:30 Climate and Resistance to Infection—Clarence A. Mills, M.D., University of Cincinnati.

12:15 Luncheon meetings.

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TUESDAY AFTERNOON, JUNE 3, 1947

Presiding Officer: Lyle Hare, M.D., Spearfish

2:00 P.M. Venous Thrombosis—Alton Ochsner, M.D., Chief, Department of Surgery, Tulane University, New Orleans, Louisiana.

2:30 Clinical Pathological Conference—John S. Howe, M.D., Director of Laboratories and Pathologist, Methodist Hospital, Brooklyn, New York.

3:15 Recess to view exhibits.

3:45 Use of Isotopes in Medical Investigation—John H. Lawrence, M.D., Assistant Professor of Medicine, University of California.

4:30 Carcinoma of the Colon—Frederick A. Coller, M.D., Chief, Department of Surgery, University of Michigan.

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South Dakota Academy of Ophthalmology and Otolaryngology

President—Paul Bunker, M.D.
Vice-President—M. W. Eggers, M.D.
Secretary-Treasurer—J. D. Alway, M.D.

SCIENTIFIC PROGRAM, MONDAY, JUNE 2, 1947

10:00 A.M. Safeguards in Cataract Surgery—Edward P. Burch, M.D., Associate Professor of Ophthalmology, University of Minnesota.

10:30 Current Problems in Otology—Lawrence R. Boies, M.D., Professor of Otolaryngology, University of Minnesota.

11:00 Lecture and Demonstration on Contact Lenses—Mr. Al Anderson, Precision Contacts, Minneapolis.

12:15 Luncheon.

Edward P. Burch, M.D.

SPECIAL COMMITTEES

Editorial Committee

As a member of this committee I wish to recommend the continuance of the Journal-Lancet as our official journal for the publication of scientific articles read at our annual meeting, the proceedings of our House of Delegates, Council and other official matters and news items and the continuance of the Bulletin published under the editorship of our executive secretary. I would like to see also more frequent use made of the Medical News section of the *Journal* of the American Medical Association under the caption South Dakota when events of more than merely state-wide interest occur. The executive secretary is in a position to handle this competently and I am sure would do so if so authorized.

Gilbert Cottam, M.D.

Committee on Medical Licensure

Your Committee on Medical Licensure reports that there were 37 applicants licensed in July, 1946. Thirty by reciprocity and seven by examination. Of these 25 located in the large towns and 12 in the smaller towns. There were 29 licensed in January, 1947. Eighteen of these by reciprocity and 11 by examination. Of these 15 located in larger towns, and 14 in the smaller ones.

The towns we considered large were: Huron, Mitchell, Sioux Falls, Aberdeen, Rapid City, Brookings, Watertown, Yankton, and Madison.

Lyle Hare, M.D.

Committee Advisory to Auxiliary

This committee has not met as a committee but the individual members have been consulted from time to time by the officers of the Auxiliary on their program in order that it might be coordinated with that of the Medical Association. Committee members have been present at all Auxiliary board meetings.

C. E. Sherwood, M.D.

Committee on Military Affairs

As chairman of the Military Affairs Committee I would like to report the excellent part our members have taken in support of national security.

Dr. Zellhoefer of Sioux Falls is president of the Reserve Officers chapter there. I am president of the Black Hills Chapter.

All the National Guard activities have received complete cooperation in examination requirements and many of our members are becoming better acquainted with the military and Veterans Administration requirements.

Probably the most outstanding contribution is that of the members who have helped make our veteran-care program a success. Each veteran who receives satisfaction in the care of the physician of his choice is in himself reason enough for our continued support of military affairs as an association.

H. E. Davidson, M.D.

Committee on Radiology

As chairman of the Committee on Radiology, I beg to report as follows:

The diagnostic field of X-ray in our state has, through the Public Health Department, started mass chest examinations, which has to date made a survey covering only a part of the job at hand and the Committee on Tuberculosis will inform us, I am sure, as to the progress of this work.

The film situation is still a problem, inasmuch as rationing is necessary, due to the general increase in volume of X-ray service to the public, which of course only registers presence of inflationary times.

The radio, press and cancer drives are stimulating irradiation demands and the entrance to our state of qualified radiologists is helping to fill existing needs in certain areas for good and better service to our patients.

N. J. Nessa, M.D.

Committee on Medical Service and Public Relations

The Committee on Medical Service and Public Relations feels that the society has made some very great strides in the past year in the fields covered by this committee. We particularly want to mention the advancement that has been made in public service through our South Dakota medical plan. This is truly a worthwhile project for the state society. This plan has had a very good start under the able direction of Dr. Brown, but it is only a start. The success or failure of this plan mainly depends on what happens in the coming year, and this committee wishes to emphasize the point that the society needs to get behind this project wholeheartedly, and put it over during the coming year. We can't leave this for the insurance company to sell. The margin of profit for the individual insurance salesman is too small for him to get out and energetically push the sale of this new insurance plan. It therefore falls back upon each doctor to sell this plan in his own community—not by actually collecting premiums for the policy—but by referring all of his patients who are interested in this plan to the insurance agent. He will be glad to write a policy for them if they come and ask for it. Further than the work of the individual doctor with his individual patient, the society needs to put on a concerted effort with radio programs and newspaper publicity throughout the state to further the sale of this insurance plan. To be a success we must have a large proportion of our population participating in it.

The public relations of medicine as a whole is being advanced by the use of radio programs and newspaper articles. Possibly South Dakota hasn't done as much in this field as some other states, but the committee feels that we have done fairly well, and wish to commend the men who have taken part in these programs.

The committee wishes to conclude this report by recommending to the society that the officers and the council do everything in their power to further the South Dakota injury-illness insurance plan during the coming year, and second, that the radio and newspaper publicity be carried on as actively as possible.

G. E. Whitson, M.D.
N. J. Nessa, M.D.
W. H. Saxton, M.D.

Committee on Prepayment and Insurance Plans

At a special meeting of the House of Delegates on January 26, 1947, a lengthy report was made of the activities of this committee prior to that date. At that time our report was adopted and we were instructed to put the South Dakota Injury-Illness Expense Plan in operation.

Following this meeting, agreement was entered into with the St. Paul Mercury Indemnity Company to write the plan in South Dakota with the endorsement and support of the S.D.S.M.A. On February 12, 1947, at a public meeting called by the Sioux Falls District Medical Society in Sioux Falls, the program was first introduced. This was followed rapidly by meetings in other localities throughout the state generally. Interest in the plan on the part of the public and doctors has been very encouraging.

Since that time the program has been promoted actively by the St. Paul Mercury Indemnity Company. Of necessity, much time and effort were first expended in educating the agents of the company, as well as the doctors generally, regarding the character of the plan. While still in its infancy, the results so far are encouraging as to enrollment.

Since inaugurating the plan, requests for information from many other insurance companies have been received. All of these have been answered by sending a specimen policy, table of rates, and copy of the agreement to be entered into with the S.D.S.M.A. Those desiring to participate in the plan have been advised to have representation at our committee meeting to be held during the present session. At this coming meeting of the committee, the progress and present status of the plan will be studied and applications for participation by other companies will be considered.

From experience gained thus far, it is apparent that greater cooperation and support from the doctors of the state is necessary to achieve widespread coverage. This is the insurance plan of the S.D.S.M.A. and was designed and endorsed by us for South Dakota people. Every member should be conversant with the details of the plan so that he can answer questions and inform others of the merits. It is our major answer to political medicine.

H. R. Brown, M.D.
R. G. Mayer, M.D.
C. E. Robbins, M.D.
R. E. Jernstrom, M.D.
C. E. Sherwood, M.D.
Wm. Duncan, M.D.

Committee on the Four-Year Medical School

During the past year, the Council as a whole has acted as the committee on the proposed four-year medical school. On several occasions we have met with Dr. I. D. Weeks, president of the university, and with Deans Ohlmacher and Slaughter to discuss ways and means of promoting the plans for the four-year school. Dr. Victor Johnson's recommendations for acceptance by the A.M.A. of the school as a class "A" institution were discussed at length—one of these being that the entire four-year course be integrated at Sioux Falls. The Council voted unanimously to support the proposed budget and plans for establishing the school at Sioux Falls.

Your chairman appeared before the appropriations committee of the legislature in February, along with President Weeks and Dean Slaughter, and told this committee that the State Medical Association endorsed the budget and plan presented at this time. The appropriation requested was $647,162.00 for the biennium of 1947-49. The legislature did not see fit to grant this appropriation, and voted not to proceed with the four-year plan. However, they did appropriate $100,000 for the biennium to proceed with the present two-year school. It is our impression that the amount of money involved influenced their decision, rather than any antagonism or objection to the four-year plan.

At the present time, the State Medical Association should decide whether or not to plan a campaign at the next session of the legislature for a four-year school. If not, then the medical society and everyone else concerned must see to it that the two-year school has an increased appropriation, so that clinical men can be hired to put on the required clinical program in the sophomore year. Whatever program is decided upon, it would do a great deal to stabilize the finances of the school if the appropriations were based on a mill levy instead of each two years having to argue with the legislature for a satisfactory appropriation.

C. E. ROBBINS, M.D.
D. S. BAUGHMAN, M.D.
F. S. HOWE, M.D.

Committee on National Legislation

Your Committee on National Legislation wishes to submit the following report:

The Murray-Wagner-Dingell Bill, at least for the present, has apparently been defeated and probably will not be reintroduced in its original form, if at all.

Public Health Bill No. 725, known as the Hill-Burton bill, passed both houses and is now in force. The preliminary allotment to South Dakota is some $12,000.00 for survey and hospital planning. This survey has already been made and a report filed. South Dakota's proportion for the first year period for construction was $359,625. No construction has been authorized as yet in this state.

Taft-Smith-Ball-Donnell Bill (Senate Bill 545) to enact a national health act has been introduced and hearings were scheduled to commence on May 21. These hearings will probably continue for about one month. Effort has been made in this bill to draw it in a way that will make it acceptable to the organized medical profession. What the fate of this bill will be in the Senate and House, we are unable to state at this time.

We believe that the threat of socialized medicine is much less at this time than it has been for sometime past. However, it is the opinion of this committee that it will be necessary for the medical profession to be on the alert and sponsor voluntary pre-payment plans.

F. S. HOWE, M.D.
R. G. MAYER, M.D.
H. R. BROWN, M.D.
C. E. ROBBINS, M.D.
J. L. CALENE, M.D.

Committee on Rural Medical Service

On February 7, Dr. M. M. Morrissey of Pierre and Dr. A. P. Peeke of Volga attended the national conference on rural health in Chicago at the Palmer House. A full report of this meeting is found on page 778 of the *Journal* of the American Medical Association, March 15 issue.

One year ago the trend of thought was for government control, immediately and absolutely. Plans for establishing hospitals and clinical centers throughout the rural areas were made. The farm organizations seemed to feel that this was the solution to the problem at that time. However, this year the farm organizations did not favor government control and were in favor of pre-payment plans. They did not feel that the medical profession should have so much control over its policies. They felt that if it was a pre-payment plan and they were paying for it, they should dictate the policies.

The Hill-Burton Act, now being law, would give substantial financial aid, one-third of the cost of the total project to be borne by the government. A certain amount was allocated for the study of the location of these centers. The little pamphlet put out by the South Dakota Health Committee, entitled "Medical Care and Health Facilities in South Dakota" has made an excellent study of the state, so that it will be much easier to properly place these various hospitals and clinical centers. Most of the discussion centered around the fact that they felt that nothing smaller than a 50 bed hospital should be erected because it would be the most efficient from the standpoint of operation and large enough to take care of many types of cases with a unit of various specialists working in it.

The great problem throughout the United States, especially in the rural areas, is the medical personnel shortage, both doctors and nurses. There are very few metropolitan areas that have sufficient doctors for the number of people. However, in South Dakota last year we only had a gain of 31 physicians, 18 of whom went to towns of over 5,000. Due to the shortage of nurses, many hospitals are going to have to close. The matter of opening or operating new, small hospitals is thereby going to be a serious problem. At one of the committee hearings the following recommendations were made:

"We recommend the development of the state and county health councils composed of representatives of the medical, dental, farm, and other organizations concerned with the rural health problem. We urge that these councils should study the health needs and develop plans and programs for improvement of rural health in each particular area. We recommend the development of adequate health facilities in rural areas where competent survey has shown that these are needed. We recognize that in order to attract and retain physicians and dentists in rural areas certain fundamentals seem necessary: (a) the provision of adequate medical facilities, (b) the provision of a reasonable income for physicians and dentists in these areas, and (c) stimulation of practice in groups. In addition we feel that there should be concommitant improvement of community educational and cultural facilities and extension of good roads and development of community understanding of its responsibilities in reference to all health matters. We also recognize that this whole problem is intimately tied in with the whole social and economic status of rural areas and that the maintenance of a reasonable and stable income of rural people is the underlying factor in the achievement of these objectives.

"We urge the development, through provision of the funds in various states, of the program of preventive medicine and dental care and that this program should be best implemented by a sound program of health education in school.

"We urge that medical schools place more emphasis on the economic problems of medicine in the medical school curriculum. We further suggest that medical school students have practical experience in rural medicine at some point in their undergraduate courses. This is already being carried out in several medical schools."

In our opinion, a successful rural medical organization should include rotation of some interns through a coordinated hospital system, including, perhaps, health centers. Our regional chairman for the Committee on Rural Medical Service for the areas of Minnesota, North and South Dakota and Nebraska made this following suggestion: Health councils should be organized on a local, county, and trade area basis, before state and national councils are developed. The objectives of these health councils might include: survey and analysis of all factors of local health problems, such as earning capacity and opportunity; housing, food and clothing; roads, transportation; churches, schools, public health services; medical, dental, and nursing personnel; hospital and diagnostic facilities, and health education activities. Secondly, the immediate organization and training of volunteer personnel in first aid and emergency home nursing to fill the gap of registered nurse availability. This activity would present the community and local doctors with an immediate pay-off or practical application in value.

It was suggested that the farm groups and organizations and the extension department of the state agricultural college could be used to good advantage.

We as members of the Committee on Rural Medical Service are wholeheartedly in support of the medical pre-payment plan as sponsored by the State Medical Association of South Dakota. We urge every doctor to promote and urge the purchase of this plan, for in this way only are we able to furnish these people of the rural areas of South Dakota with adequate economical full coverage.

A. P. Peeke, M.D.

Advisory to Departments of State Board of Health

Committee on Ophthalmology and Otolaryngology

Now that the war is over but peace not in sight we think it is time to start up some of the special programs that were interrupted by the war.

We wish to continue our help to the "Crippled Children" and "Aid to Blind" programs, etc., as carried out in this state through the Public Health Department.

We are doing our best to help the veterans and hope to continue this.

Several new men are coming to the state. We will be glad to do our part in anything the State Medical Association undertakes.

H. D. Newby, M.D.

Committee on Orthopedics

I. Crippled Children's Register for 1946:

	1st Quarter *	2nd Quarter †	3rd Quarter ‡	4th Quarter §
A. Crippled Children on Register (at end of quarter)	2,215	2,217	2,456	2,444
B. Clinic Service				
a. Admissions (diagnostic or treatment)	34	196	21	19
b. Visits by children to clinics	22	367	38	50
c. Field or office visits in lieu of service at clinics	47	68	46	41
C. Hospital Care				
a. Children under care at beginning of quarter	11	18	24	19
b. Admissions—total	47	42	70	41
c. Total under care	58	60	94	61
d. Discharges	40	36	75	36
e. Days care provided	1,555	1,365	2,230	2,434

II. Clinics Held During 1946:

There were eight clinics held at the following places:

Aberdeen, May 22
Belle Fourche, June 28
Mobridge, June 14
Rapid City, May 16
Mitchell, June 12
Watertown, May 23
Winner, June 21
Yankton, May 8

III. Budget:

Funds needed for a twelve months plan operation for the Division of Crippled Children in South Dakota:

Total funds necessary for 12 months operation, $73,180

Breakdown of funds:

State funds, $30,000; other, $43,000

IV. Diagnosis of Crippled Children on Register by Quarters for 1946:

	1st Quarter *	2nd Quarter †	3rd Quarter ‡	4th Quarter §
1. Poliomyelitis	285	283	502	501
2. Tuberculosis and osteomyelitis	92	90	89	88
3. Spastic paralysis	101	105	102	101
4. Cleft palate and harelip	177	176	177	180
5. Club foot	159	166	170	170
6. Congenital dislocation of hips	88	91	86	84
7. Other congenital defects (spina bifida, bactylism, torticollis)	150	151	152	152
8. Injuries (fractures, burns, amputations, etc.)	205	203	206	203
9. Foot disabilities (flat feet, pronated feet, bunions, etc.)	177	180	194	184
10. Eye defects (strabismus, ptosis, cataracts, etc.)	313	318	322	318
11. All other disabilities (rickets, arthritis, osteochondritis, muscular dystrophy, tumors, birth paralysis, etc.)	365	375	378	379
12. Provisional (diagnosis undetermined)	86	85	83	82

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* Jan., Feb., March; † April, May, June; ‡ July, Aug., Sept.; § Oct., Nov., Dec.

G. E. Van Demark, M.D.

Committee on Social Security

It should be called to our attention at this time that, with the government providing more and more services to the citizens, the cost of the social security program in this country is rising steadily. The latest service which some would delegate to the government is that of health insurance. The major proposal is that introduced by Senators Taft, Smith, Ball and Donnell in S. 545 entitled the National Health Act of 1947. The annual report of the Social Security Administartion has recommended such a program. It deals both with organization and program in the fields of health.

S. 712, introduced by Senator Aiken on February 26, provides for the conversion of the Federal Security Agency to a Cabinet Department of Health, Education and Security.

This is the social security picture as we see it today. It is a large and ever growing financial drain on the budget by bureaucrats and means a large additional number of salaried government employees to administer the program. No active steps have been taken as yet on Social Security, but the committees are working on them and no doubt there will be an attempt to expand the Social Security program.

N. Wells Stewart, M.D.

ADDRESS OF THE PRESIDENT

F. S. Howe, M.D.

Deadwood, South Dakota

Believing as I do that our most urgent problem in this state is medical and hospital care, I shall devote my presidential address to this subject. Without minimizing, however, the threat of socialized medicine, I am of the opinion that at the present time the lack of and improper distribution of physicians and hospitals is our most serious problem. According to the last State Board of Health figures, we have at the present time 409 physicians in actual practice in the state. Of this number, 104 are over 65 years of age. Referring to their distribution, we have at the present ten counties without any M.D.'s. We also have six counties, each containing an area of a thousand square miles or more in which there is only one physician. While it is true that modern highways and the automobile have made it possible for a physician to cover a much larger area than he could possibly do in the old horse and buggy days, yet poor road conditions during winter and spring months make it practically impossible to supply people living in rural areas with proper medical care.

Theoretically, an active physician may be expected to take care of approximately 1500 people. According to the 1940 census, our population was 642,961. While this would mean one physician for slightly less than 1600 people, their distribution is such that there are many large areas in the state that are either very poorly served or have practically no medical and hospital service. There is apparently a tendency for the younger men to start practice in the larger cities of our state. While in these cities there are enough physicians to look after the health needs of the community, in the smaller towns and

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Presented at the 66th Annual Session of the South Dakota State Medical Association, June 2, 1947.

rural areas this is not the case. I am unable to agree with those who believe that this is merely a temporary situation.

Surgeon General Parran, in a recent address read before the 43rd annual Congress of Medical Education in Chicago, states "that our present facilities are equipped to turn out about 5200 graduates a year." Through death and retirement, we should expect to lose about 3850 doctors annually. This leaves us a net yearly gain of approximately 1350 physicians. The estimated normal increase of population will require not less than 2000 more physicians yearly. It will be seen from these figures that with the present facilities we cannot possibly graduate enough physicians to take care of the normal increase in population.

Pre-payment plans for medical service together with the educational campaign of the public in health matters will make for more calls on the physician. There will naturally be from year to year increased demands on the physicians from these causes alone. While the changes in the economic situation from time to time may either increase or temporarily decrease the demands upon the physician, yet over a period of time we know that from past experience and present trends that there will be ever-increasing demands upon the physician. The problem resolves itself into two parts. First, the number of physicians in the state and second, their distribution. We fully realize that in order to attract the right type of physician, hospital facilities are absolutely essential. At the same time, however, we must face the fact that hospitals without physicians are worse than useless. There is another angle to our problem—that as time goes on, there will be need for a larger number of doctors for full-time local health departments, also the Veterans Administration will need more and more physicians. This is not only a South Dakota problem but also a national problem.

Dr. Parran estimates that by 1960, if the present training program remains the same, we will have a deficit of at least 30,000 in the United States. To meet this deficit, we would need to increase the number of our medical graduates by 50 per cent during each of the next twelve years. South Dakota, being largely a state of rural communities, has a serious need for general practitioners. It is only in some of our larger towns that we have great need for specialists. We cannot help wondering if the craze for specialization, as a result of which the average boy who studies medicine is a specialist when he enters medical school, has not been entirely overdone. It is my considered opinion that the best specialist is a man who has had a background of several years in general practice.

In studying further the reason for the improper distribution of physicians, we quote from the Health Survey, "First, lack of accessible hospital and laboratory facilities and second, lack of contact with specialists and consultants." We would like to add also that the lack of educational and cultural advantages in the somewhat isolated communities is very frequently a deciding factor in the physician's decision to locate in the larger cities rather than in the rural areas. In all fairness, we must state that one of the very important reasons for well-trained young physicians not locating in the smaller towns and rural areas is the tendency on the part of the public to drive to the larger cities for medical and surgical treatment, using the services of the local doctor—no matter how well trained he may be—merely for emergencies and minor ailments.

The hospital situation in our state is also quite unsatisfactory. At the present time, there are 43 hospitals registered by the American Medical Association in South Dakota. These have a total bed capacity of 2,243. This makes a total of 3.5 beds per 1,000 population while a ratio of at least 5 to 1,000 is needed for good hospitalization. Owing to the large and sparsely populated areas, this should, no doubt, be higher in our state. Pre-payment hospital plans, emergency maternity and infant care for wives and infants of service men, some of the newer drugs requiring hospitalization, and the shortage of physicians making it impossible for physicians to make the calls in the homes which they formerly were able to do, tend to make more hospital beds necessary. The distribution of our hospitals is also a serious problem. Thirty-six of our 69 counties have no registered hospitals. Some of our people have to travel up to 112 miles to reach a hospital.

We have 13 cities or villages in the state that have hospitals that have been closed in recent years either for the lack of funds or, what is more likely, the lack of a physician. Practically every community in the state has written or made formal application for Federal Aid either for an addition to their present hospital facilities or for the building of a new hospital. The State Board of Health has been designated as the sole agency for the administration of Public Law 725, which provides for grants for planning and construction of hospitals. South Dakota's proportion of the $75,000,000 grant for the first year would be $359,475.00—the public health grant to be one-third of the total amount, the community to raise the other two-thirds. One of the requirements of the Surgeon General's regulations is that an organization which secures final approval must be able to show that they are financially able to carry on after the building is erected. It has been estimated that the present per day cost per patient for hospitalization is $7.18. It is obvious that the hospital is not and cannot be a money-making institution, as it is impossible for the hospitals in our state to make a sufficient charge to cover this expense. Dr. Cottam, who is ex-officio chairman of the State Advisory Council, authorizes me to say that no community can hope to get a final approval for federal aid unless they can show that their organization is financially able to carry on after the hospital is erected. We would, therefore, urge a conservative attitude on the part of those that are seeking federal aid, especially in the smaller communities where very great difficulty would, no doubt, be found in keeping the hospital open after it was built.

Coming back to the matter of medical education—as all of you know, we have at the present time a two-year medical school which is not fully approved. While an effort was made to secure an appropriation for the four-year school, the legislature failed to make this appropriation. The question arises, therefore, first, how is a South Dakota boy who wishes to study medicine to secure entrance to a Class A school and be able to obtain a medical education? Second, can we hope by putting in a four-year medical school to secure the general practitioners which we so urgently need in this state? This is a controversial subject and one on which there are honest differences of opinion.

We can, however, lay down certain rules or basic facts which in our opinion are essential. First, we must be certain that we shall have a Class A school. We are all agreed that if we cannot have this, we had best forget the whole thing. Second, there can be no doubt that all four years' training must be given at one place rather than divided between two cities. The report of Doctors MacEwan and Johnson states, "it would be a severe handicap to a new school to commence operations as a divided school." I have talked with the deans of other medical schools where this same question came up. These men did not hesitate to advise that it was absolutely essential that we give all four year's training in the same city. They had no hesitancy in saying that unless we did this, we would start out with a handicap which we could not hope to overcome, and it would be best not to attempt the establishment of the school. I personally believe that we, in this state, can develop an outstanding medical center. This center must be located where there is sufficient population to furnish adequate clinical facilities. While we would not and could not be positive that our graduates would remain in South Dakota, the fact remains that most of our graduates would be South Dakota boys and we could, at least, expect a large number of them to remain in our state. The establishment of the four-year course will of necessity be expensive. We do not, however, hesitate to train teachers, mining engineers, and county agents because this training costs money. How much more important it is to train competent doctors to look after the health of our people. In my judgment, South Dakota should have a four-year medical school which specializes in training general practitioners, rather than specialists.

There seems to be a great variation of opinion relative to the actual expense involved. While the Dean of the Medical School has gone into the matter very thoroughly, and no doubt his estimates are accurate, those who do not favor the school have placed the estimates at two and three times the estimate of Dr. Slaughter. We would, therefore, urge that the incoming president appoint a committee, preferably headed by the Dean of the Medical School, with full authority to act and secure all possible information and data relative to the expense and other details connected with the four-year medical school. We have a number of other states not larger than South Dakota that already have excellent four-year medical schools. This committee should be asked to get complete data as to expense, faculty, buildings required, and all other information necessary and to present the complete facts and figures to the Council of the South Dakota State Medical Association for their approval, the complete report to be made available to the committee on public health of the state legislature. With this authoritative report at hand, we would then be in a position to decide definitely as to the four-year medical school.

I believe that two-year medical schools are on the way out and that with us it is either a four-year medical school or none. I cannot agree with those who advocate the Mississippi plan, which provides for a two-year medical school course in the state, subsidizing the student by loaning him money to complete his medical education in another state. I fail to see how we could consistently oppose socialized medicine and enter into such an arrangement. If the state is going to loan money to medical students, where are we going to stop? We, in this state, have had one never-to-be-forgotten lesson in the disastrous consequences resulting from the state loaning money to individuals. There is also a shortage of pharmacists and of dentists. We would, therefore, be asked to subsidize these students, also. Politics would necessarily enter in. I am personally unalterably opposed to such an arrangement. The whole question of the shortage of physicians and hospitals, distribution of physicians, and medical education in our state is not one that will be solved today or tomorrow. It is a long-time proposition and will require most careful and painstaking study. To my mind, it is our most important problem and one which challenges the best efforts and thought of the best minds in our profession.

Address of the President-Elect

H. Russell Brown, M.D.
Watertown, South Dakota

This 66th annual session of the South Dakota State Medical Association promises to be outstanding in the history of the organization. No small measure of credit should be accorded to Dr. Howe, our president, and our hosts, the Black Hills District Medical Society, for the fine work they have done. Of importance, too, is the part that has been played by our executive secretary and his office in the success of this meeting.

It would be out of order if I did not express first my deep appreciation for this honor and privilege of serving as your president during the coming year. Not long ago this office was largely honorary, and its essential function was the conduction of the annual scientific meeting. During the last several years, however, the problems

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facing medicine have multiplied tremendously and involve other fields, particularly that of economics. It seems safe to state that medical societies are confronted with more major problems today than we had minor ones in past years. To seek and discover constructive solutions for these problems is our obligation and responsibility. Serious study and thought by each of us, followed by unified action as a profession, is a necessity if we are to achieve results.

Of prime importance is the question of so-called compulsory sickness insurance or political medicine. As proposed, this is not insurance but rather, a new form of taxation to create another large governmental bureau. The medical profession is preponderantly opposed to it because there is valid reason to believe that it will be an expensive, wasteful method of supplying a deteriorating grade of medical care, and that it will not accomplish its main objectives. Because the political complexion of Congress has changed, and because of previous defeats to that type of legislation, we must not believe that the battle is won. As a matter of fact, it is far from won, and this subject will need much more of our attention in the future than has been given to it in the past.

During past months, increasing numbers of articles have appeared in the nation's magazines dealing with the subject of inadequate medical care. While many of these writers exaggerate the seriousness of the situation and predicate their statements on the time-worn and misleading selective service statistics, nevertheless there is an increasing public demand that something be done about the distribution of medical care. The medical profession must supply leadership in solving this problem dealing with medical care, or someone else will do it. It is not enough to actively oppose programs fostering political medicine. We must consider and find the remedy for conditions that are demanding a solution. I am sure that few of us will deny that inadequate and poorly distributed medical care does exist in our state.

Our Veterans Administration program in South Dakota is functioning well and is one step in the right direction. As now organized and operating, I think we are rendering prompt and valuable service to the veteran and the Veterans Administration. The future may offer an extension of the scope of service to veterans. It would be well for us to study this possibility now, so that we may reach a prompt and sound decision, when and if this occurs.

While only three months old, our prepayment insurance program is off to a good start, and is another sound step forward. It needs the solid support of every physician to make it effective. The public must be educated to take advantage of this form of budgeting medical and hospital expense. Only by widespread coverage can we prove that voluntary insurance plans can do the job. Present prosperous conditions must not blind us to the need that exists. For many years we have failed to ask the help of the Women's Auxiliary in a task of any magnitude. To my mind the Auxiliary could perform a very valuable service in actively promoting the South Dakota Injury-Illness Expense Plan. This could well be its major project for the ensuing year and great accomplishments are possible.

Serious thought should be devoted to the shortage of doctors in South Dakota, particularly in rural areas. Some improvement will result when small rural hospitals have been constructed under provisions of the Hill-Burton bill. Without question, more general practitioners are needed in the smaller communities of South Dakota. The medical profession should exert leadership in determining ways and means of bringing this about. Without being controversial about the value of a four-year medical school in South Dakota, I believe this organization should have a unified opinion before the next legislative session. We should also investigate the possibilities of a program designed to subsidize the medical education of South Dakota boys, such as that recently put into effect in Mississippi. The Illinois State Medical Association has recommended a state-sponsored revolving scholarship fund for the education of medical students who agree to practice in rural Illinois. After reaching a sound decision as to the method by which our rural medical care problem can best be solved, we should forcibly express our opinion at the next legislative session.

It is my belief that this organization, and its component district societies, should promote more actively the formation of additional public health units throughout the state. More efficient and extensive preventive medicine campaigns and public health facilities are needed in South Dakota. For many reasons this field cannot be covered properly by the part time county health officer. The association has endorsed this previously, but further encouragement would be helpful because it is a valuable and needed program.

Far-reaching action was taken last year when we increased our dues, employed an executive secretary, and established a central office. Mr. John Foster has been efficient, willing, and energetic in his duties as executive secretary. Many tangible things have been accomplished by his office, but I believe that a great amount of intangible benefit has been realized, and will accrue to the profession in the future, in the field of public relations. And a most important consideration in this field is that inter-relationship existing within the profession itself.

As it is constituted now, this association has greater potentiality than ever before. Its strength and accomplishments in the future, however, will be proportionate to the interest, activity, and energy of the component district societies and their individual membership. Regular meetings with interesting programs are a prerequisite to good attendance. Scientific and social programs should properly share time with meetings devoted to a discussion of medical economic problems whether they be local, state, or national. Your councilors and delegates should be properly advised as to your desires in matters requiring action by the association. Likewise you should receive full and complete reports of Council and House of Delegate meetings by those who represent your district society. To bring closer the relationship between the state association and the individual member, I regard it an obligation to visit each district society during the ensuing year, and await only your invitation.

Before concluding, permit me to say that I deem the honor of this office very secondary to the privilege of serving with such a fine, sincere group of men as are represented by your officers, Council, and House of Delegates. An obligation and an opportunity for service exist and we must meet that by the time-honored method of medicine, namely, consultation, diagnosis, and proper treatment. In closing, I ask for and anticipate the firm support and cooperation of each doctor and each district society in the serious work which lies ahead of all of us.

South Dakota State Medical Association Roster - 1947

MEMBERSHIP BY DISTRICTS

ABERDEEN DISTRICT NO. 1

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SECRETARY	
J. C. Rodine	Aberdeen
Alway, J. D.	Aberdeen
Bloemendaal, G. J.	Ipswich
Brenckle, J. F.	Mellette
Brinkman, W. C.	Veblen
Bruner, J. E.	Aberdeen
Bunker, Paul G.	Aberdeen
Calene, J. L.	Aberdeen
Cooley, F. H.	Aberdeen
Damm, W. P.	Redfield
Drissen, E. M.	Britton
Eckrich, J. A.	Aberdeen
Farrell, W. D.	Aberdeen
Gelber, M. R.	Aberdeen
Graeber, F. O.	Eureka
Graeber, M. P.	Eureka
Graff, L. W.	Britton
King, H. I.	Aberdeen
King, Owen	Aberdeen
Mayer, R. G.	Aberdeen
McBroom, D. E.	Redfield
McCarthy, P. V.	Aberdeen
McIntosh, G. P.	Eureka
Murdy, B. C.	Aberdeen
Murdy, C. B.	Aberdeen
Murdy, Robert	Aberdeen
Pittenger, E. A.	Aberdeen
Ranney, T. P.	Aberdeen
Rodine, J. C.	Aberdeen
Rudolph, E. A.	Aberdeen
Scallin, P. R.	Redfield
Schuchardt, I. L.	Aberdeen
Weishaar, C. H.	Aberdeen
*White, W. E.	Ipswich
Whiteside, J. D.	Aberdeen
Williams, M. F.	Conde

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SECRETARY	
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Bartron, G. R.	Watertown
Bartron, H. J.	Watertown
Bartron, H. J., Jr.	Watertown
Bates, J. S.	Lake Preston
Brown, H. R.	Watertown
Christensen, A. H.	Clark
*Crawford, J. H.	Watertown
Crawford, J. H., Jr.	Watertown
*Hammond, M. J.	Watertown
Hickman, G. L.	Bryant
Jorgenson, M. C.	Watertown
Kenney, H. T.	Watertown
Kilgard, R. M.	Watertown
Larsen, M. W.	Watertown
Magee, W. G.	Watertown
Maxwell, R. T.	Clear Lake
McIntyre, P. S.	Bradley
Randall, O. S.	Watertown
Rousseau, M. C.	Watertown
Scheib, A. P.	Watertown
Schmidt, Mary A.	Watertown
Walters, S. J.	Watertown
Willen, Abner	Clark

MADISON DISTRICT NO. 3

PRESIDENT	
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SECRETARY	
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Austin, D. C.	Brookings
Baughman, D. S.	Madison
Davidson, Magni	Brookings
Drobinsky, Miguel	Estelline
Grove, E. H.	Arlington
Gulbrandsen, G. H.	Brookings
Hofer, E. A.	Howard
Jordan, L. E.	Chester
Kershner, C. M.	Brookings
Muggly, J. R.	Madison
Peeke, A. P.	Volga
Plowman, E. T.	Brookings
Scheller, D. L.	Arlington
Sherwood, C. E.	Madison
Ross, R. R.	Canova
Tank, M. C.	Brookings
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Watson, E. S.	Brookings
Westaby, J. R.	Madison
Whitson, G. E.	Madison

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SECRETARY	
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Cottam, Gilbert	Pierre
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Hetrick, M. A.	Pierre
Janis, J. B.	Hoven
*Kimble, O. A.	Murdo
Martin, H. B.	Harrold
Morrissey, M. M.	Pierre
Murphy, J. C.	Murdo
*Northrup, F. A.	Pierre
Riggs, T. F.	Pierre
Robbins, C. E.	Pierre
Van Heuvelen, G. J.	Pierre

HURON DISTRICT NO. 5

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SECRETARY	
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Adams, H. P.	Huron
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Hagin, J. C.	Miller
Hohm, P. M.	Huron
Hohm, T. A.	Huron
Jacoby, Hans	Huron
Lenz, B. T.	Huron
Pangburn, M. W.	Miller
Saxton, Wm. H.	Huron
*Saylor, H. L., Sr.	Huron
Shirley, J. C.	Huron
Tschetter, Joseph	Huron
Tschetter, J. S.	Huron
Tschetter, P. S.	Huron
*Wright, O. R.	Huron

MITCHELL DISTRICT NO. 6

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SECRETARY	
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Ball, W. R.	Mitchell
Beukelman, W. H.	Stickney
Bobb, C. S.	Mitchell
Bobb, E. C.	Mitchell
Cochran, F. B.	Plankinton
Dean, Roscoe	Wessington Sprgs.
Delaney, R. J.	Mitchell
Delaney, W. A.	Mitchell
Delaney, W. A., Jr.	Mitchell
Dick, L. C.	Spencer
Dickinson, John	Canistota
*Freyberg, F. W.	Mitchell
Gillis, F. D.	Mitchell
Hoyne, A. H.	Salem
Jones, T. D.	Chamberlain
Kay, Paul	Armour
*Keene, F. F.	Wessington Springs
Lloyd, J. H.	Mitchell
Mabee, D. R.	Mitchell
Mabee, O. J.	Mitchell
Moran, C. S.	Mitchell
Skogmo, B. R.	Mitchell
Tobin, F. J.	Mitchell
Tobin, L. W.	Mitchell
Weber, R. A.	Mitchell

SIOUX FALLS DISTRICT NO. 7

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SECRETARY
C. J. McDonald — Sioux Falls

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Billingsley, P. R.	Sioux Falls
Billion, T. J.	Sioux Falls
Billion, T. J., Jr.	Sioux Falls
Boyd, F. E., Jr.	Flandreau
Breit, D. H.	Sioux Falls
Carney, Myrtle	Sioux Falls
Clark, J. C.	Sioux Falls
Cottam, G. I. W.	Sioux Falls
Culbertson, R. A.	Sioux Falls
Dehli, H. M.	Colton
Devall, F. C.	Garretson
Donahoe, S. A.	Sioux Falls
Donahoe, W. E.	Sioux Falls
Duimstra, Fred	Sioux Falls
Dulaney, C. H.	Canton
Dunn, J. D.	Sioux Falls
Eggers, M. W.	Sioux Falls
Ericksen, E. G.	Sioux Falls
Erickson, O. C.	Sioux Falls
Fiske, R. R.	Flandreau
Gage, E. E.	Sioux Falls
Green, R. D.	Sioux Falls
Greenfield, J. C.	Sioux Falls
Gregg, J. B.	Sioux Falls
Groebner, O. A.	Sioux Falls
Grove, A. F.	Dell Rapids
Grove, M. S.	Sioux Falls
Grove, R. F.	Sioux Falls
Harris, A. M.	Sioux Falls
* Hummer, H. R.	Sioux Falls
Hyden, Anton	Sioux Falls
Ihle, C. W.	Sioux Falls
* Kalayjian, D. S.	Parker
Keller, S. A.	Sioux Falls
Kittelson, J. A.	Sioux Falls
Lamb, Hazel	Sioux Falls
Lanam, M. O.	Sioux Falls
Leraar, L. G.	Sioux Falls
Manning, D. H.	Sioux Falls
McDonald, C. J.	Sioux Falls
McGreevy, John	Sioux Falls
* Mullen, R. W.	Sioux Falls
Nelson, J. A.	Sioux Falls
Nessa, N. J.	Sioux Falls
Nilsson, F. C.	Sioux Falls
Ogborn, R. J.	Sioux Falls
Opheim, O. V.	Sioux Falls
Pankow, L. J.	Sioux Falls
Parke, L. L.	Canton
Quinn, R. H.	Sioux Falls
Reagan, Paul	Sioux Falls
Reagan, Rezin	Sioux Falls
Rich, E. L.	Sioux Falls
Sercl, W. F.	Sioux Falls
Shreve, Howard	Sioux Falls
Smith, Jesse	Sioux Falls
Stahman, Fred	Sioux Falls
Stevens, G. A.	Sioux Falls
Unruh, B. H.	Sioux Falls
Van Demark, G.	Sioux Falls
Van Demark, R.	Sioux Falls
Volin, H. P.	Lennox
Wallis, Marianne	Sioux Falls
Wessman, N. E.	Sioux Falls
Zellhoefer, H. W. K.	Sioux Falls
Zimmerman, Goldie	Sioux Falls

YANKTON DISTRICT NO. 8

PRESIDENT
V. I. Lacey — Yankton

SECRETARY
F. J. Abts — Yankton

Abts, F. J.	Yankton
Andre, H. C.	Vermillion
Auld, M. A.	Yankton
Blezek, F. M.	Tabor
Bollinger, W. F.	Parkston
Brookman, L. J.	Vermillion
Bushnell, W. F.	Elk Point
Duggan, T. A.	Wagner
Greenfield, J. C.	Avon
Haas, F. W.	Yankton
Hansen, H. F.	Vermillion
Hofer, E. J.	Freeman
Hohf, J. A.	Yankton
Hohf, S. M.	Yankton
Hubner, R. F.	Yankton
Jordan, G. T.	Vermillion
Joyce, Edward	Hurley
* Keeling, C. M.	Springfield
Kemper, C. E.	Viborg
Lacey, V. I.	Yankton
Leonard, B. B.	Yankton
McVay, C. B.	Yankton
Ohlmacher, J. C.	Vermillion
Reding, A. P.	Marion
Rieb, W. G.	Parkston
Schwartz, E. R.	Wakonda
Slaughter, Donald	Vermillion
Smith, A. J.	Yankton
Stansbury, E. M.	Vermillion
Williams, D. B.	Yankton

BLACK HILLS DISTRICT NO. 9

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N. Wells Stewart — Lead

SECRETARY
A. A. Lampert — Rapid City

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Bailey, S. G.	Hot Springs
Borgmeyer, H. J.	Rapid City
Bourke, W. A.	Ft. Meade
Brock, E. H.	Rapid City
* Butler, C. A.	Hot Springs
Butler, J. M.	Hot Springs
Byrne, J. R.	Edgemont
Clark, B. S.	Spearfish
Clark, O. H.	Newell
Davidson, H. E.	Lead
Davis, J. H.	Belle Fourche
Dawley, W. A.	Rapid City
Dillon, J. A.	Rapid City
Erickson, J. W.	Rapid City
Ewald, P. P.	Lead
Fleeger, R. B.	Rapid City
Gilbert, F. J.	Belle Fourche
Hare, Lyle	Spearfish
Holleman, W. E.	Rapid City
Howe, F. S.	Deadwood
Hultz, E. B.	Hill City
Jackson, A. S.	Lead
* Jackson, R. J.	Rapid City
Jernstrom, R. E.	Rapid City
Kegaries, D. L.	Rapid City
Lampert, A. A.	Rapid City
Laxson, G. A.	Ft. Meade
Lemley, Ray E.	Rapid City
Matlock, W. L.	Deadwood
Mattox, N. E.	Lead
Merryman, M. P.	Rapid City
Meyer, W. L.	Sanator
Miller, G. A.	Hot Springs
* Miller, G. H.	Spearfish
Mills, G. W.	Wall
Morse, W. E.	Rapid City
Morsman, C. F.	Hot Springs
McCroskey, R. C.	Rapid City
Neves, C. A.	Hot Springs
Newby, H. D.	Rapid City
Ogg, F.	Hot Springs
Olson, W.	Ft. Meade
Orvedahl, F. W.	Sturgis
O'Toole, T. F.	Rapid City
Owen, G. S.	Rapid City
Owen, N. T.	Rapid City
Paulson, A. W.	Rapid City
Pemberton, M. O.	Deadwood
Philips, S.	Memphis, Tenn.
Radusch, F. J.	Rapid City
Sherrill, S. F.	Belle Fourche
Smiley, J. C.	Deadwood
Soe, C. A.	Lead
Spain, M. L.	Rapid City
Stewart, J. L.	Spearfish
Stewart, N. W.	Lead
Swift, C. L.	Martin
* Townsend, L. J.	Belle Fourche
* Threadgold, J. O.	Belle Fourche
Williams, F. R.	Rapid City

ROSEBUD DISTRICT NO. 10

Lande, L. E.	Winner
Malster, R. N.	Carter
Mannion, J. E.	Gregory
Quinn, R. J.	Burke
Studenberg, J. E.	Winner
Wilson, Rex W.	Burke

NORTHWEST DISTRICT NO. 11

PRESIDENT
W. A. George — Selby

SECRETARY
L. D. Harris — Mobridge

* Fleishman, Morris	Cheyenne Agcy.
George, W. A.	Selby
Harris, L. D.	Mobridge
Lowe, C. E.	Mobridge
Spiry, A. W.	Mobridge
Steiner, Peter	Lemmon
Totten, F. C.	Lemmon

WHETSTONE VALLEY DISTRICT NO. 12

PRESIDENT
Faris Pfister — Webster

SECRETARY
W. H. Karlins — Webster

Brauer, H. H.	Sisseton
Duncan, William	Webster
Gregory, D. A.	Milbank
Hawkins, A. P.	Waubay
Judge, W. T.	Milbank
Karlins, W. H.	Webster
Lovering, Joseph	Webster
* Peabody, P. D.	Webster
Peabody, P. D., Jr.	Sisseton
Pfister, Faris	Webster
Tauber, Kurt S.	Milbank
Younker, F. T.	Sisseton

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* Indicates honorary member.

Roster- South Dakota State Medical Association, 1947

Abts, F. J.	Yankton
Adams, H. P.	Huron
Alway, J. D.	Aberdeen
Andre, Hugo	Vermillion
Arneson, W. A.	Sioux Falls
Auld, C. V.	Plankington
Auld, M. A.	Yankton
Austin, Dean	Brookings
Bailey, J. D.	Rapid City
Bailey, S. G.	Hot Springs
Ball, W. R.	Mitchell
Bartron, G. R.	Watertown
Bartron, H. J.	Watertown
Bartron, H. J., Jr.	Watertown
Bates, J. S.	Lake Preston
Baughman, D. S.	Madison
Beukelman, W. H.	Stickney
Billingsley, P. R.	Sioux Falls
*Billion, T. J.	Sioux Falls
Billion, T. J., Jr.	Sioux Falls
Blezek, F. M.	Tabor
Bloemendaal, G. J.	Ipswich
Bobb, C. S.	Mitchell
Bobb, E. C.	Mitchell
Bollinger, W. F.	Parkston
Borgmeyer, H. J.	Rapid City
Bourke, W. A.	Ft. Meade
Boyd, F. E., Jr.	Flandreau
Brauer, Harry H.	Sisseton
Breit, Donald H.	Sioux Falls
Brenckle, J. F.	Mellette
Brinkman, W. C.	Veblen
Brock, E. H.	Rapid City
Brookman, L. J.	Vermillion
Brown, H. R.	Watertown
Bruner, J. E.	Aberdeen
Buchanan, R. A.	Huron
Bunker, P. G.	Aberdeen
Burman, G. E.	DeSmet
Bushnell, W. F.	Elk Point
*Butler, C. A.	Hot Springs
Butler, J. M.	Hot Springs
Byrne, J. R.	Edgemont
Calene, J. L.	Aberdeen
Carney, J. G.	Los Angeles, Calif.
Carney, Myrtle	Sioux Falls
Christenson, A. H.	Clark
Clark, B. S.	Spearfish
Clark, J. C.	Sioux Falls
Clark, O. H.	Newell
Cochran, F. B.	Plankington
Collins, E. H.	Gettysburg
Cooley, F. H.	Aberdeen
Cottam, Gilbert	Pierre
Cottam, G. I. W.	Sioux Falls
Cowan, J. T.	Pierre
*Crawford, J. H.	Watertown
Crawford, J. H., Jr.	Watertown
Creamer, F. H.	Dupree
Culbertson, R. A.	Sioux Falls
Damm, W. P.	Redfield
Davidson, H. E.	Lead
Davidson, Magni	Brookings
Davis, J. H.	Belle Fourche
Dawley, W. A.	Rapid City
Dean, Roscoe	Wessington Springs
Dehli, H. M.	Colton
Delaney, Robert	Mitchell
Delaney, W. A.	Mitchell
Delaney, W. A., Jr.	Mitchell
Devall, F. C.	Garretson
Dick, L. C.	Spencer
Dickinson, John	Canistota
Dillon, J. A.	Rapid City
Donahoe, S. A.	Sioux Falls
Donahoe, W. E.	Sioux Falls
Drissen, E. M.	Britton
Drobinsky, Miguel	Estelline
Duggan, T. A.	Wagner
Duimstra, Fred	Sioux Falls
Dulaney, C. H.	Canton
Duncan, William	Webster
Dunn, J. D.	Sioux Falls
Eckrich, J. A.	Aberdeen
Eggers, Maynard	Sioux Falls
Ericksen, Emil	Sioux Falls
Erickson, J. W.	Rapid City
Erickson, O. C.	Sioux Falls
Ewald, P. P.	Lead
Fairbanks, W. H.	Vermillion
Farrell, W. D.	Aberdeen
Fiske, R. R.	Flandreau
Fleeger, R. B.	Lead
*Fleishman, Harold	Cheyenne Agency
*Freyberg, F. W.	Mitchell
*Gage, E. E.	Sioux Falls
Gelber, M. R.	Aberdeen
George, W. A.	Selby
Gilbert, F. J.	Belle Fourche
Gillis, F. D.	Mitchell
Graeber, F. O.	Eureka
Graeber, M. P.	Eureka
Graff, Leo W.	Britton
Green, R. D.	Sioux Falls
Greenfield, J. C.	Avon
Greenfield, R. E.	Sioux Falls
Gregg, J. B.	Sioux Falls
Gregory, D. A.	Milbank
Groebner, O. A.	Sioux Falls
Grove, A. F.	Dell Rapids
Grove, E. H.	Arlington
Grove, M. S.	Sioux Falls
Grove, Ray F.	Sioux Falls
Gulbrandson, G. H.	Brookings
Haas, F. W.	Yankton
Hagin, J. C.	Miller
*Hammond, M. J.	Watertown
Hansen, H. F.	Vermillion
Hare, Lyle	Spearfish
Harris, A. M.	Sioux Falls
Harris, L. D.	Mobridge
Hawkins, A. P.	Waubay
Hetrick, M. A.	Pierre
Hickman, G. L.	Bryant
Hofer, E. A.	Howard
Hofer, E. J.	Freeman
Hohf, J. A.	Yankton
Hohf, S. M.	Yankton
Hohm, Paul	Huron
Hohm, Theodore	Huron
Holleman, W. E.	Rapid City
Howe, F. S.	Deadwood
Hoyne, A. H.	Salem
Hubner, R. F.	Yankton
Hultz, E. B.	Hill City
*Hummer, H. R.	Sioux Falls
Hyden, Anton	Sioux Falls
Ihle, C. W.	Sioux Falls
Jackson, A. S.	Lead
*Jackson, R. J.	Rapid City
Jacoby, Hans	Huron
Janis, J. B.	Hoven
Jernstrom, R. E.	Rapid City
Jones, T. D.	Chamberlain
Jordan, G. T.	Vermillion
Jordan, L. E.	Chester
Jorgenson, M. C.	Watertown
Joyce, E.	Hurley
Judge, W. T.	Milbank
*Kalayjian, D. S.	Parker
Karlins, W. H.	Webster
Kay, Paul	Armour
*Keeling, C. M.	Springfield
*Keene, F. F.	Wessington Springs
Kegaries, D. L.	Rapid City
Keller, S. A.	Sioux Falls
Kemper, C. E.	Viborg
Kenney, H. T.	Watertown
Kershner, C. M.	Brookings
Kilgard, R. M.	Watertown
*Kimble, O. A.	Murdo
King, H. I.	Aberdeen
King, Owen	Aberdeen
Kittelson, J. A.	Sioux Falls
Lacey, V. I.	Yankton
Lamb, Hazel	Sioux Falls
Lampert, A. A.	Rapid City
Lanam, M. O.	Sioux Falls
Lande, L. E.	Winner
Larsen, M. W.	Watertown
Laxson, G. A.	Ft. Meade
Lemley, Ray E.	Rapid City
Lenz, B. T.	Huron
Leonard, B. B.	Yankton
Leraan, L. G.	Sioux Falls
Lloyd, J. H.	Mitchell
Lovering, Joseph	Webster
Lowe, C. E.	Mobridge
Mabee, D. R.	Mitchell
Mabee, O. J.	Mitchell
Magee, W. G.	Watertown
Malster, R. N.	Carter
Manning, D. H.	Sioux Falls
Mannion, J. E.	Gregory
Martin, H. B.	Harrold
Matlock, W. L.	Deadwood
Mattox, N. E.	Lead
Maxwell, R. T.	Clear Lake
Mayer, R. G.	Aberdeen
Merryman, M. P.	Rapid City
Meyer, W. L.	Sanator
Miller, George A.	Hot Springs
*Miller, G. H.	Spearfish
Mills, G. W.	Wall
Moran, C. S.	Mitchell
Morrissey, M. M.	Pierre
Morse, W. E.	Rapid City
Morsman, C. F.	Hot Springs
Muggly, J. A.	Madison
*Mullen, R. W.	Sioux Falls
Murdy, B. C.	Aberdeen
Murdy, C. B.	Aberdeen
Murdy, Robert	Aberdeen
Murphy, J. C.	Murdo
McBroom, D. E.	Redfield
McCarthy, P. V.	Aberdeen
McCroskey, R. C.	Rapid City
McDonald, C. J.	Sioux Falls
McGreevy, J. V.	Sioux Falls
McIntosh, G. F.	Eureka
McIntyre, P. S.	Bradley
McVay, C. B.	Yankton
Nelson, J. A.	Sioux Falls
Nessa, N. J.	Sioux Falls
Neves, Carl A.	Hot Springs
Newby, H. D.	Rapid City
Nilsson, F. C.	Sioux Falls
*Northrup, F. A.	Pierre
Ogborn, R. J.	Sioux Falls
Ogg, F.	Hot Springs
Ohlmacher, J. C.	Vermillion
Olson, W.	Ft. Meade
Opheim, O. V.	Sioux Falls
Orvedahl, F. W.	Hot Springs
O'Toole, T. F.	Rapid City
Owen, G. S.	Rapid City
Owen, N. T.	Rapid City
Pangburn, M. W.	Miller

Pankow, L. J.	Sioux Falls
Parke, L. L.	Canton
Paulson, A. W.	Rapid City
*Peabody, P. D.	Webster
Peabody, P. D., Jr.	Sisseton
Peeke, A. P.	Volga
Pemberton, M. O.	Deadwood
Pfister, Faris	Webster
Philips, S.	Memphis, Tenn.
Pittenger, E. A.	Aberdeen
Plowman, E. T.	Brookings
Quinn, R. H.	Sioux Falls
Quinn, R. J.	Burke
Radusch, F. J.	Rapid City
Randall, O. S.	Watertown
Ranney, T. P.	Aberdeen
Reagan, Paul C.	Sioux Falls
Reagan, Rezin	Sioux Falls
Reding, A. P.	Marion
Rich, E. L.	Sioux Falls
Rieb, W. G.	Parkston
Riggs, T. F.	Pierre
Robbins, C. E.	Pierre
Rodine, J. C.	Aberdeen
Ross, R. R.	Canova
Rousseau, M. C.	Watertown
Rudolph, E. A.	Aberdeen
Rudolph, F. A.	Rapid City
*Saylor, H. L., Sr.	Huron
Saxton, W. H.	Huron
Scallin, Paul R.	Redfield
Scheib, A. P.	Watertown
Scheller, D. L.	Arlington
Schmidt, Mary A.	Watertown
Schuchardt, I. L.	Aberdeen
Schwartz, E. R.	Wakonda
Serel, W. F.	Sioux Falls
Sherrill, S. F.	Belle Fourche
Sherwood, C. E.	Madison
Shirley, J. C.	Huron
Shreve, Howard	Sioux Falls
Skogmo, B. R.	Mitchell
Slaughter, Donald	Vermillion
Smiley, J. C.	Deadwood
Smith, A. J.	Yankton
Smith, Jesse	Sioux Falls
Soe, Carl A.	Lead
Spain, M. L.	Rapid City
Spiry, A. W.	Mobridge
Stahman, Fred	Sioux Falls
Stansbury, E. M.	Vermillion
Steiner, Peter K.	Lemmon
Stevens, George A.	Sioux Falls
*Stewart, J. L.	Spearfish
Stewart, N. Wells	Lead
Studenberg, J. E.	Winner
Swift, C. L.	Martin
Tank, M. C.	Brookings
Tauber, K. S.	Milbank
*Threadgold, J. O.	Belle Fourche
Tobin, F. J.	Mitchell
Tobin, L. W.	Mitchell
*Torwick, E. E.	Volga
Totten, F. C.	Lemmon
*Townsend, L. J.	Belle Fourche
Tschetter, Joseph	Huron
Tschetter, J. S.	Huron
Tschetter, P. S.	Huron
Unruh, B. H.	Sioux Falls
Van Demark, G. E.	Sioux Falls
Van Demark, Robert	Sioux Falls
Van Heuvelen, G. J.	Pierre
*Volin, H. P.	Lennox
Wallis, Marianne	Sioux Falls
Walters, S. J.	Watertown
Watson, E. S.	Brookings
Weber, R. A.	Mitchell
Weishaar, C. H.	Aberdeen
Wessman, N. E.	Sioux Falls
Westaby, J. R.	Madison
*White, W. E.	Ipswich
Whiteside, J. D.	Aberdeen
Whitson, G. E.	Madison
Willen, Abner	Clark
Williams, D. B.	Yankton
Williams, I. R.	Rapid City
Williams, M. F.	Conde
Wilson, Rex W.	Burke
*Wright, O. R.	Huron
Younker, F. T.	Sisseton
Zellhoefer, H. W. K.	Sioux Falls
Zimmerman, Goldie	Sioux Falls

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* Indicates honorary member.

WOMAN'S AUXILIARY TO THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION

Officers

President	Mrs. H. Russell Brown, Watertown
President-elect	Mrs. J. L. Calene, Aberdeen
First Vice President	Mrs. Myron W. Larsen, Watertown
Second Vice President	Mrs. J. H. Lloyd, Mitchell
Recording Secretary	Mrs. Kurt S. Tauber, Milbank
Cor. Sec. and Treas.	Mrs. William Duncan, Webster
Past President	Mrs. William Duncan, Webster

Chairmen of Standing Committees

Hygeia	Mrs. Faris Pfister, Webster
Bulletin	Mrs. A. J. Struble, Centerville
Legislative	Mrs. C. E. Robbins, Pierre
Organization	Mrs. Myron W. Larsen, Watertown
Program	Mrs. M. R. Gelber, Aberdeen
Public Relations	Mrs. F. W. Minty, Rapid City
Historian	Mrs. G. S. Adams, Yankton

South Dakota State Medical Benevolent Committee

Chairman	Mrs. J. C. Hagin, Miller
Secretary-Treasurer	C. E. Sherwood, M.D., Madison

Advisory Council

C. E. Sherwood, M.D., Chairman	Madison
W. H. Saxton, M.D.	Huron
C. E. Robbins, M.D.	Pierre

President's Report 1946-47

Mrs. H. Russell Brown of Watertown was elected president of the Woman's Auxiliary to the South Dakota State Medical Association at its 37th annual meeting in Rapid City, May 31 through June 3, 1947. Other officers are: Mrs. J. L. Calene, Aberdeen, president-elect; Mrs. Myron W. Larsen, Watertown, first vice president; Mrs. J. H. Lloyd, Mitchell, second vice president; Mrs. Kurt S. Tauber, Milbank, recording secretary, and Mrs. William Duncan, Webster, corresponding secretary and treasurer.

The Executive and Advisory Board met in the Alex Johnson Hotel at 9:30 A.M. on the 2nd of June, 1947. Members attending were Mrs. Wm. Duncan, Mrs. M. R. Gelber, Mrs. F. W. Minty, Mrs. J. C. Hagin, Mrs. R. W. Brown, Mrs. Howe, Mrs. Schwartz, and Mrs. Paul Bunker. There was a discussion of the Benevolent Fund.

The following committees were appointed: Courtesy—Mrs. McVay and Mrs. Quinn; auditing—Mrs. Minty and Mrs. Hagin; nominating—Mrs. Minty and Mrs. Gelber.

The Woman's Auxiliary to the South Dakota State Medical Association met in the Alex Johnson Hotel at 11:00 on June 2, 1947. The president read the pledge. Minutes of the 1946 annual meeting were read and approved. Minutes of the Executive Board meeting were read and approved. Mrs. Hagin reported on the Benevolent Fund. She read a report from Dr. Sherwood urging the Auxiliary to help build the fund to the required $5,000. A motion was made by Mrs. Hagin and seconded by Mrs. Minty for an assessment of $1.00 a year to be collected from all Auxiliary members when the dues are paid. The motion was carried. Mrs. Gelber reported for the Program committee and urged all the Auxiliary units to continue the program of helping to promote the Health Insurance plan. Mrs. Minty reported for the Auditing committee; the Treasurer's report was accepted.

Mrs. Buchanan made a motion for the Auxiliary to donate $10.00 to the Crippled Children's fund. It was carried.

Bills were allowed for: Mrs. Wm. Duncan, for expenses, $10.00; Mrs. Paul Bunker, $2.76 for postage and telephone calls.

The meeting was adjourned until after lunch.

The meeting resumed at 1:30 o'clock. A report of the Courtesy committee was heard which expressed appreciation to the Black Hills District for the grand entertainment. Mrs. Minty reported for the Nominating committee. A unanimous ballot was cast for the following officers:

President—Mrs. H. R. Brown, Watertown.
1st Vice President—Mrs. M. Larsen, Watertown.
2nd Vice President—Mrs. J. H. Lloyd, Mitchell.
Recording Secretary—Mrs. N. J. Nessa, Sioux Falls.
Corresponding Secretary—Mrs. J. S. Hagin, Miller.
Past President—Mrs. Wm. Duncan, Webster.

There being no further business, the meeting was adjourned.

A special meeting of the South Dakota Medical Auxiliary met in the Alex Johnson Hotel at 12:00 Noon, June 3, 1947. Mrs. Hagin resigned as corresponding secretary, as she has served in all the offices of the Auxiliary; in several of them for two years. Mrs. William Duncan was elected to the office of corresponding secretary.

A very interesting talk was given us by Dr. H. R. Brown, president of the South Dakota State Medical Association, and also by the executive secretary, Mr. John Foster.

The past year I have sent out 150 letters urging all doctors' wives to become members of the Auxiliary units and feel that we have had a very good increase in membership.

MRS. WILLIAM DUNCAN

ROSTER, 1947 — MEMBERSHIP BY DISTRICTS

ABERDEEN DISTRICT NO. 1

Alway, Mrs. J. D.	Aberdeen
Bunker, Mrs. Paul G.	Aberdeen
Calene, Mrs. John L.	Aberdeen
Cooley, Mrs. Frank H.	Aberdeen
Gelber, Mrs. M. R.	Aberdeen
Graeber, Mrs. Fred O.	Aberdeen
Graeber, Mrs. Mark P.	Eureka
King, Mrs. Owen	Aberdeen
Martyn, Mrs. W. E.	Aberdeen
Mayer, Mrs. R. G.	Aberdeen
McIntosh, Mrs. George	Eureka
Murdy, Mrs. B. C.	Aberdeen
Murdy, Mrs. Carson	Aberdeen
Murdy, Mrs. Robert	Aberdeen
Pittenger, Mrs. E. A.	Aberdeen
Ranney, Mrs. Thomas P.	Aberdeen
Rudolph, Mrs. Edward A.	Aberdeen

WATERTOWN DISTRICT NO. 2

Bartron, Mrs. G. Robert	Watertown
Bartron, Mrs. Harry, Jr.	Watertown
Brown, Mrs. H. Russell	Watertown
Crawford, Mrs. J. H., Jr. (or Schmidt, Dr. Mary A.)	Watertown
Hammond, Mrs. M. J.	Watertown
Jorgenson, Mrs. Milton C.	Watertown
Kilgard, Mrs. Ross M.	Watertown
Larsen, Mrs. Myron W.	Watertown
Magee, Mrs. William G.	Watertown
Randall, Mrs. O. Samuel	Watertown
Rousseau, Mrs. M. C.	Watertown
Scheib, Mrs. A. P.	Watertown
Vaughn, Mrs. James B.	Castlewood
Walters, Mrs. Stanley J.	Watertown

MADISON DISTRICT NO. 3

Austin, Mrs. D. C.	Brookings
Baughman, Mrs. D. S.	Madison
Boyd, Mrs. F. E.	Flandreau
Davidson, Mrs. Magni	Brookings
Drobinsky, Mrs. Miguel	Estelline
Grove, Mrs. E. H.	Arlington
Gulbrandson, Mrs. G. H.	Brookings
Hoger, Mrs. E. A.	Howard
Muggly, Mrs. J. A.	Madison
Peeke, Mrs. A. P.	Volga
Plowman, Mrs. E. T.	Brookings
Scheller, Mrs. D. L.	Arlington
Sherwood, Mrs. C. E.	Madison
Tank, Mrs. M. C.	Brookings
Watson, Mrs. E. S.	Brookings
Westaby, Mrs. J. R.	Madison
Whitson, Mrs. G. E.	Madison

PIERRE DISTRICT NO. 4

Collins, Mrs. E. H.	Gettysburg
Creamer, Mrs. F. H.	Dupree
Fleishman, Mrs. Harold	Cheyenne Agency
Hetrick, Mrs. M. A.	Pierre
Martin, Mrs. H. B.	Harrold
Morrissey, Mrs. M. M.	Pierre
Murphy, Mrs. J. C.	Pierre
Riggs, Mrs. T. F.	Pierre
Robbins, Mrs. C. E.	Pierre
Salladay, Mrs. I. R.	Pierre
VanHeuvelen, Mrs. C. E.	Pierre

HURON DISTRICT NO. 5

Adams, Mrs. Harold	Huron
Buchanan, Mrs. Robert A.	Huron
Hagin, Mrs. J. C.	Miller
Hohm, Mrs. Paul	Huron
Hohm, Mrs. Theodore	Huron
Jacoby, Mrs. Hans	Huron
Lenz, Mrs. B. T.	Huron
Pangburn, Mrs. M. W.	Miller
Saylor, Mrs. Howard L.	Huron
Shirley, Mrs. John C.	Huron
Saxton, Mrs. W. H.	Huron
Tschetter, Mrs. John S.	Huron
Tschetter, Mrs. Joseph	Huron
Tschetter, Mrs. Paul S.	Huron

MITCHELL DISTRICT NO. 6

Ball, Mrs. W. R.	Mitchell
Beukelman, Mrs. W. H.	Stickney
Bobb, Mrs. C. S.	Mitchell
Bobb, Mrs. E. C.	Mitchell
Delaney, Mrs. W. A.	Mitchell
Delaney, Mrs. W. A., Jr.	Mitchell
Freyberg, Mrs. F. W.	Mitchell
Gillis, Mrs. F. D.	Mitchell
Lloyd, Mrs. J. H.	Mitchell
Mabee, Mrs. D. R.	Mitchell
Mabee, Mrs. O. J.	Mitchell
McGreevey, Mrs. J. V.	Sioux Falls
Moran, Mrs. C. S.	Mitchell
Rieb, Mrs. W. G.	Parkston
Tobin, Mrs. F. J.	Mitchell
Tobin, Mrs. L. W.	Mitchell
Weber, Mrs. R. A.	Mitchell

SIOUX FALLS DISTRICT NO. 7

Arneson, Mrs. Wallace	Sioux Falls
Billion, Mrs. T. J.	Sioux Falls
Breit, Mrs. D. H.	Sioux Falls
Dehli, Mrs. H. M.	Colton
Duimstra, Mrs. Fred	Sioux Falls
Ericksen, Mrs. Emil	Sioux Falls
Erickson, Mrs. O. Chas.	Sioux Falls
Fiske, Mrs. Roscoe R.	Flandreau
Gage, Mrs. E. E.	Sioux Falls
Gregg, Mrs. J. B.	Sioux Falls
Hanson, Mrs. Otto	Valley Springs
Harris, Mrs. A. M.	Sioux Falls
Hyden, Mrs. Anton	Sioux Falls
Kittelson, Mrs. John A.	Sioux Falls
Lanam, Mrs. M. C.	Sioux Falls
Leraan, Mrs. L. G.	Sioux Falls
Manning, Mrs. D. H.	Sioux Falls
McDonald, Mrs. Chas. J.	Sioux Falls
McGreevy, Mrs. John V.	Sioux Falls
Nelson, Mrs. J. A.	Sioux Falls
Nessa, Mrs. N. J.	Sioux Falls
Nilsson, Mrs. F. C.	Sioux Falls
Ogborn, Mrs. Robert	Sioux Falls
Pankow, Mrs. L. J.	Sioux Falls
Quinn, Mrs. Robert	Sioux Falls
Reagan, Mrs. Paul	Sioux Falls
Reagan, Mrs. R. R.	Sioux Falls
Rich, Mrs. E. L.	Sioux Falls
Sercl, Mrs. William F.	Sioux Falls
Stahman, Mrs. Fred S.	Sioux Falls
Van Demark, Mrs. Robert G.	Lennox
Ver Meulen, Mrs. Peter	Sioux Falls
Zellhoefer, Mrs. H. W. K.	Sioux Falls

YANKTON DISTRICT NO. 8

Abts, Mrs. F. J.	Yankton
Adams, Mrs. G. S.	Yankton
Auld, Mrs. M. A.	Yankton
Blezek, Mrs. F. M.	Tabor
Dugan, Mrs. T. A.	Wagner
Greenfield, Mrs. J. C.	Avon
Haas, Mrs. F. W.	Yankton
Hohf, Mrs. J. A.	Yankton
Hubner, Mrs. R. F.	Yankton
Joyce, Mrs. E.	Hurley
Lacey, Mrs. V. I.	Yankton
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Book Reviews

The Differential Diagnosis of Jaundice, by LEON SCHIFF, Ph.D., M.D. Chicago: The Year Book Publishers, Inc., 1946; 313 pp. with index, illustrated, one color plate; $5.50. (One of the General Practice manuals.)

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Precise determination of the cause of jaundice is now of consequential importance. Recent experience with infectious hepatitis has illuminated long dark phases of icteric hepatic disease. Knowledge of the functions of the liver derived from chemical and metabolic studies has fructified therapeusis. Bold surgery, sanely justifiable because of ancillary and supportive measures now available, is actually curative for conditions previously considered to be intractable. Estimation of extent of liver damage and degree of dysfunction is possible from results of several well-proved methods. Under these circumstances, a discussion of the differential diagnosis of jaundice is not only timely, but mandatory.

Leon Schiff, Associate Professor of Medicine of the University of Cincinnati, has presented currently accepted ideology of liver disease, and recounted specific procedures for identification of the several causes for jaundice. Recognition of the basis for icterus, in a particular instance, should lead to definitive treatment. J. C.

Office Endocrinology, by ROBERT B. GREENBLATT, B.A., M.D., C.M., third edition. Springfield, Illinois: Chas. C. Thomas, 1947; 280 pp.; illustrated; $4.75.

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This manual on endocrinology is written for the practicing physician. The third edition includes a new chapter on the interpretation of basal temperature records; the two hour pregnancy test of Kupperman is described. It is well illustrated, and concisely brings the reader up-to-date on the ever-changing views regarding hormone therapy.

As in the previous editions, salient points on the physiology of menstruation are given and a colored plate of secretory type of endometrium is included. The treatment of irregular uterine bleeding is well outlined. More emphasis could have been placed on thyroid medication but it is mentioned in a short chapter. This synopsis includes the handling of acne, obesity and sterility which are common complaints today.

The physician who reads this manual will probably prescribe hormones less frequently but more judiciously than heretofore. Every practicing physician will welcome this book from a reliable source as a guide to better understanding of such a confusing subject as endocrinology. N. W.

A Textbook of Pathology, by E. T. BELL, Professor of Pathology, University of Minnesota. Contributors, B. J. CLAWSON, M.D., and J. S. MCCARTNEY, M.D.; sixth edition, enlarged and thoroughly revised with 500 illustrations and four color plates. Philadelphia: Lea & Febiger, 1947; 910 pp.; $10.

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Dr. Bell has drawn upon his large personal experience. Controversial material is sometimes presented from the author's point of view, and some interesting points are treated briefly. Without this sort of compromise, it is doubtful if so much could have been written in this convenient-size volume. The chapter on renal disease clearly explains and illustrates the author's concepts, which are expanded in his book, *Renal Disease*, recently published. Sufficient references are placed throughout the book so that the reader may easily be directed to the more extensive works.

This is an up-to-date textbook of pathology, and it is recommended to students and practitioners alike for reference or study. It is probably the best textbook of pathology in the English language. H. W.

. . . MEET OUR CONTRIBUTORS . . .

Albert M. Harris, M.D., Sioux Falls, South Dakota, is pathologist for the Sioux Valley Hospital and associate professor of Clinical Pathology at the University of South Dakota; is a graduate of the University of Nebraska, B.Sc., M.D., class of 1939, with graduate work at the University of Nebraska, University of Arkansas and U. S. Army; is a member of the South Dakota State Medical Association, American Society of Clinical Pathologists, and the College of American Pathologists.

H. Archibald Nissen, M.D., Boston, Massachusetts, was a contributor to the July issue of JOURNAL-LANCET.

Paul G. Bunker, M.D., has practiced in Aberdeen, South Dakota, for 15 years; is a graduate of the University of Minnesota, B.S., B.M., M.D., class of 1928, with graduate work at the following universities: Minnesota, Temple, Northwestern, Denver, Illinois; specializes in otolaryngology and broncho-esophagology; is a member of the American, South Dakota, and Sioux Valley Academies of Ophthalmology and Otolaryngology, the American Broncho-Esophagological Association (honorary society), South Dakota State Medical Association, and Aberdeen District Medical Society.

The
JOURNAL
LANCET

Official Journal of the

American Student Health Association
Great Northern Railway Surgeons' Association
Minneapolis Academy of Medicine
Montana State Medical Association
North Dakota Society of Obstetrics and Gynecology
North Dakota State Medical Association
Northwestern Pediatric Society
Sioux Valley Medical Association
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Editorials

BRUCELLOSIS — NOW A MAJOR PUBLIC HEALTH PROBLEM

When I graduated from medical school more than twenty-five years ago, there were a lot of tropical diseases that we read about that were of academic interest only. We were sure that up here in the great Midwest we would never be called upon to treat such cases. In fact, I am not sure that we did not resent just a little that we ever had to read about such remote diseases. As a result of this premise, some of us have had to do some tall studying and digging to find a diagnosis for some of those same diseases that we were never going to have to treat.

Such a disease is Brucellosis—it was called Malta fever in those days. There was another disease that we read about called Bang's disease, which was just a veterinary problem because it affected cows and caused them to lose their calves. It was quite a while before we found out that both Bang's disease and Malta fever, together with related strains of the same organism in other domestic animals, notably hogs, and probably in horses, sheep, chickens and maybe even in our old friend, the dog, are all the same disease, and that probably every strain of the germ can cause, in the human, the disease now called Brucellosis.

Much work is being done toward diagnosis, but much remains to be done. There are at least two phases of the disease, the acute and the chronic, and a very different picture obtains in each. In the acute stage, one is very apt to confuse the disease with influenza or tuberculosis. During the acute stage, an agglutination test with the patient's blood may be very suggestive, although the degree of agglutination is *not* an index to the severity of the infection. Also, during the acute stage, one is more apt to find a positive blood culture—that is, if you have culture bottles available and competent technicians to read the results. (Too many laboratories have technicians afraid of infection, and refuse to work with it at all). Fortunately, the Department of Public Health of Minnesota, and certain areas of South Dakota that I know of, are availing themselves of a technic devised in Mexico, and that is a safe and sure culture method—if the germs are floating in the blood stream at the time the test is taken.

Your subacute patient, however, is the one that really needs help, and on whom the diagnosis is harder to make. That patient probably has symptoms of everything—from acute rheumatic fever to psychoneurosis neurasthenia. He has a multiplicity of complaints and you probably will not find anything positive in your examination. His history may disclose repeated bouts of "flu". His location or occupation may add suspicion because, rural people using raw milk and home-butchered meats, or working with livestock, or in packing plant, are much more liable to have the disease than others. In this case, with such a set of symptoms and a reasonable possibility of an exposure, a skin test, if positive, is to me sufficient evidence to make a diagnosis. Then, if treatment improves the state of the patient's health, I am willing to go all out and make a flat-footed diagnosis.

Ridicule may come from some sources for such a diagnostic stand, but many luetics have been treated with less evidence. Any symptoms, or even none at all, with no history but a positive blood serology, are diagnosed as lues, and so treated. Why then is it so ridiculous to diagnose Brucellosis in a patient who *does* have symptoms, and *does* have a positive skin test, and who *does* improve under treatment?

Doctors of the midwest, keep your minds open to Brucellosis. Urge and agitate for the eradication of infected animals from our herds that are supplying the public with milk and meat. Remember that there are a lot of people unable to work because of this disease. Become brucellosis conscious!

L. J. Pankow, M.D.,
Sioux Falls, South Dakota

American Student Health Association

NEWS LETTER

Dr. Lawrence W. Holden of the University of Colorado, Boulder, Colorado, has collected a set of plans for infirmaries and dispensaries in student health services. He would be glad to loan these plans to anyone who is interested in studying them as a basis for a new building or for remodeling. Dr. Holden is chairman of the standing committee on environmental hygiene.

Dr. Lena M. English has been employed as Assistant Director of the Student Health Service at the University of New Hampshire, Durham, New Hampshire.

The University of Arkansas, Fayetteville, Arkansas, has applied for membership in the American Student Health Association. The Director of Student Health is Fount Richardson, M.D.

STUDENT HEALTH PRACTICES

Report of Effectiveness of Influenza Virus Vaccine A & B at Bucknell University, 1946-47

During the fall of 1946 it was decided to immunize the students and employees of Bucknell University with the Influenza Virus Vaccine A & B. In October two subcutaneous injections of 0.5 ml. were given at weekly intervals and then in January, 1947, a "booster" of 0.5 ml. was given subcutaneously.

In this report we have excluded faculty members and employees from our data and have included only the student body. Our patients with "flu" were those who had been admitted to the infirmary or were known to have had influenza. Questionable and afebrile cases were excluded.

During the fall months and until the end of February, 1947, the influenzal morbidity was lower than it has been for years. However, in March, 1947, we began to see a large number of patients which we classed as a mild type of influenza. Many of these patients were able to attend classes or stayed in their rooms for one day.

There were 2,043 students enrolled at Bucknell University and 1,249 were immunized. In the immunized group 88 cases had influenza, while in the non-immunized group of 794 there were 58 cases of influenza. There was no significant difference in the two groups. ($P = 0.80$).

The data from the women students is interesting. There was a total of 631 girls of which 435 were immunized, and 45 of the immunized group developed influenza. In the non-immunized group of 196 there were only 7 cases of influenza. However, the low incidence in the non-immunized group barely reaches the level of significance ($P = 0.05$) and it is believed the figures in this group are explained purely by chance.

The patients had fever ranging up to 102° F. and the duration was brief, being on an average of about 36 to 48 hours. Four developed pneumonia.

No studies were made of the type of infection in this epidemic. Obviously it would be a great help for us to know whether virus A or B was responsible or whether it was due to some other member of the virus alphabet.

Since our experience does not confirm the published reports which showed a significantly lowered influenzal morbidity in vaccinated groups, we believe the virus in the present epidemic differs antigenically from the virus A & B.

Lester P. Fowle, M.D., and
Joseph Weightman, M.D.,
Bucknell University, Lewisburg, Pa.

"Our information to date indicates that the strain of virus we have encountered is quite different from those with which we have had previous experience and it seems likely this will account for the lack of effect observed following vaccination."—Thomas Francis, Jr., M.D., Director, Commission on Influenza, School of Public Health, Ann Arbor, Michigan.

News Items

NEWS FROM SOUTH DAKOTA

Dr. R. Perry Elrod, formerly on the staff of the Rockefeller Institute for Medical Research, Princeton, New Jersey, has been appointed professor of microbiology and public health at the South Dakota state university medical school, according to President I. D. Weeks.

Gov. George T. Mickelson reappointed Dr. R. J. Quinn, Burke, to the state board of health and George Hunter, Deadwood, to the state aeronautics commission. Dr. Quinn was named for a five-year term. Other members are Dr. Lyle Hare, Spearfish; Dr. Clarence E. Sherwood, Madison; Dr. G. C. Redfield, Rapid City, and Dr. Gilbert Cottam, superintendent, Pierre.

Dr. T. H. Billion, Jr., after an absence of seven years from Sioux Falls, most of which time was spent in the military service, has returned to join his father in the practice of medicine.

The 721 patients at Fort Meade's new psychiatric hospital enjoy regularly scheduled athletic periods at the gymnasium building which is supervised by the veterans' administration. An outdoor swimming pool enables patients to engage in healthful water sports under the watchful eye of hospital attendants. Dr. Wm. Bourke, clinical director, is in charge of the hospital facility and directs the administrative work carried on in the building where the hospital reception headquarters is located. More than three-fourths of the patients at Fort Meade are veterans of the first world war.

Dr. W. A. Delaney, Sr., of Mitchell was elected as a fellow in the International College of Surgeons.

Twenty-three physicians were admitted to practice in South Dakota by the state board of health, Superintendent Gilbert Cottam announced in August. Licensed by reciprocity were LeRoy Charles Askwig, Pierre; Bruce T. Brookman, Chamberlain; Davis Robert Brown, Elk Point; Charles A. Castle, Watertown; Paul Gamber Culley, Aberdeen; Jasper W. Davis, Madison; Lorin Drezel Dawson, Milbank; Edward Martel Eneboe, Alcester; Wayne A. Geib, Rapid City; David Gregory, Milbank; Charley Franklin Gutch, Pierre; Robert B. Henry, Brookings; Richard Keith Morgan, Winner; Francis Willard Ogg, Hot Springs; Warren Lee Reinoehl, Wessington Springs; Charles Rodney Stoltz, Watertown.

Admitted upon examination were Richard Curtis Baughman, Madison; Gerhard Orville Bern, Sioux Falls; Marvin Hurewitz, Flandreau; Harvard Rees Lewis, Mitchell; Robert Folds Livingston, Yankton; Mary Elizabeth Sanders, Redfield, and Harold A. Stokes, Aberdeen.

Dr. Francis J. Tobin, Mitchell physician, was one of 762 physicians admitted on September 12 as fellows of the American College of Surgeons. Dr. Tobin has been practicing in Mitchell since 1921, with the exception of the years between 1927 and 1932, when he practiced in Aberdeen and Parkston.

The appointment of Dr. A. A. Armour of Chicago to head the X-ray department at the Methodist State hospital, Mitchell, was announced September 5 by E. R. Andres, hospital director.

Registration of medical students at the state university, Vermillion, for the school year 1947-48 has been completed with a total of 54 students in the two-year school of medicine, according to figures released September 13 by Dr. Donald Slaughter, dean of the school. Of the 30 freshmen medical students, 23 are from South Dakota.

Students from South Dakota account for 74 per cent of the enrollment in the school of medicine, Dean Slaughter stated, compared with only 60 per cent coming from this state in former years. The increase in enrollments from South Dakota indicates to Dean Slaughter that the recently strengthened faculty and facilities are attracting more students from the state, which, he pointed out, is as it should be.

Other factors attracting South Dakotans to their own school of medicine as listed by Dean Slaughter are the low tuition costs and the fact that the legislature has approved a four-year medical school for the university, even though it is not yet in operation. "These South Dakota boys want to practice in their own state," Dean Slaughter said, "and they want to get their training here. They are hopeful that the four-year school may be a reality by the time they are ready for it."

Plans for the 24 second-year medical students as announced by Dean Slaughter include a four-week assignment to doctors all over South Dakota next spring just before the end of the second semester. Doctors in the state are being very co-operative, the Dean said, in inviting the medical students into their offices for four weeks of observation next spring.

NEWS FROM NORTH DAKOTA

Resignation of Dr. R. D. Campbell as chief of the medical staff of St. Michael's hospital, Grand Forks, after 29 years service in the post, was announced September 9 by Dr. W. H. Witherstine, who was appointed to succeed Dr. Campbell. Dr. Campbell is a past president and secretary of the North Dakota State Medical association. He has also been prominent in the Grand Forks District medical society. Dr. Witherstine has been head of the surgical department of the hospital for a number of years. He is a fellow in the American College of Surgeons, a member of the American Medical association, the state and district medical societies.

Dr. Arthur Cullen Burt, Fargo surgeon, is one of four North Dakota physicians who have been admitted to fellowship in the American College of Surgeons. Other North Dakotans admitted to fellowship are Doctors Charles A. Arneson and Robert F. Nuessle, Bismarck, and Albert H. Reiswig, Wahpeton. Dr. Burt came to Fargo in 1941, after being associated with a Detroit, Michigan, hospital.

Dr. Gerald F. Brown of the department of obstetrics and gynecology of the Grand Forks Clinic recently received his certificate as a diplomate of the American Board of Obstetrics and Gynecology. He came to the clinic in 1941 and after one year entered the U. S. army medical corps in July, 1942, serving four years as chief of station and general hospitals in London and Berlin. He returned as a partner in the clinic April 1, 1946.

Dr. Russell O. Saxvik, Bismarck, acting state health officer since April 2, was appointed state health officer by Gov. Fred G. Aandahl for a four-year term ending June 30, 1951. Dr. Saxvik became acting state health officer when Dr. W. M. Smith resigned. Prior to that time he was director of the division of child and maternal hygiene of the state health department and served five years in the army medical corps.

Drs. Charles A. Arneson, Bismarck, Arthur C. Burt, Fargo; Robert F. Nuessle, Bismarck, and Albert H. Reiswig, Wahpeton, were accepted into fellowship of the American College of Surgeons on September 12.

NEWS FROM MONTANA

Dr. E. M. Larson, president of the Montana Tuberculosis association, and head of the Great Falls clinic, attended the meeting of the northern great plains council September 8-13 at Rapid City, South Dakota. Dr. Larson is a member of the health committee of the council, which embraces Kansas, North Dakota, South Dakota, Nebraska, Wyoming and Montana.

Montana's new state mental hygiene division, which will find and treat psychopathic cases, will be headed by Dr. Winfield S. Wilder, former Lewistown resident. The 1947 state legislature authorized the new division, to be administered by the state hospital at Warm Springs. The division will aid in relieving congestion at the hospital by treating some cases outside the institution. Dr. Wilder said his program will be limited at first, due to lack of funds, but that he plans to set up offices in Missoula later and to establish clinical service at Missoula, Great Falls, Glasgow and other Montana cities eventually.

Dr. B. K. Kilbourne, Helena, secretary of the Montana board of health, has announced the appointment of Dr. Lynn J. Lull as state epidemiologist, the position left vacant when Dr. Kilbourne was advanced to health board secretary more than a year ago. Dr. Lull came to Montana from Idaho, where he was director of the Idaho state division of venereal diseases of the state board of health. He formerly served also in the Colorado state board of health offices. He is a graduate of the Loyola university medical school in Chicago and received his degree in public health from Yale university in 1940. Dr. Kilbourne also stated that Dr. Arthur E. Rikli, director of the state division of tuberculosis control, is taking graduate instruction at Johns Hopkins university in Baltimore. Whether Dr. Rikli will return to Montana depends upon assignment by the federal public health service.

Dr. C. A. Clark, Eureka, has accepted a position as assistant professor in student health at Montana State college.

Dr. M. V. Hargett, Missoula, has been released from the Rocky Mountain laboratory, where he has been connected since 1940 doing research with yellow fever vaccine, to become medical officer for five states in the Indian service at Billings. The states are North and South Dakota, Wyoming, Nebraska and Montana.

Drs. Edward W. Gibbs, Billings; Harold D. Harlowe, Miles City; Chester W. Lawson, Havre; William R. Movius, Billings; Charles W. Pemberton, Butte, and George A. Sexton, Great Falls, were accepted into fellowship of the American College of Surgeons on September 12.

NEWS FROM MINNESOTA

Dr. A. E. Cardle of Minneapolis was elected 1948 president of the Minnesota State Medical Association at the annual convention in July. Other officers are Dr. J. R. Manley, Duluth, first vice president; Dr. G. I. Badeaux, Brainerd, second vice president; Dr. B. J. Souster, St. Paul, secretary, and Dr. W. H. Condon, Minneapolis, treasurer.

Dr. Alfred W. Adson, Mayo Clinic neuro-surgeon, was awarded the 1947 distinguished service medal of the Minnesota State Medical Association at the Association's convention.

Drs. Edward B. Tuohy and Paul C. Kiernan have resigned their positions on the Mayo Clinic staff to become members of the staff of Georgetown University medical center, Washington, D. C., Dr. Tuohy as professor of anesthesiology and Dr. Kiernan as associate professor of surgery.

Dr. Paul F. Dwan has been elected president of the Minnesota Heart Association, a project initiated by the Heart Committee of the Minnesota State Medical Association.

The Minnesota Society of Neurology and Psychiatry met September 13 at St. Mary's Hospital, Duluth. Dr. E. L. Tuohy was co-ordinator of the clinical program.

One of a series of 10 orthopedic clinics which will be conducted throughout the state this fall, will be held October 18 at Mankato for nine southern Minnesota counties. Open to all crippled persons under 21, the clinics will include medical examinations by orthopedic surgeons, diagnosis and recommendation for treatment and also vocational advice for those over 16.

Dr. Erling G. Hestenes, resident physician at St. John's hospital, St. Paul, will establish a medical mission and public health service in Africa starting early next year.

Dr. Earl C. Elkins, Mayo Clinic, Rochester, was elected first vice president of the American Congress of Physical Medicine at the meeting which was held the first week in September in Minneapolis.

Dr. J. Arthur Myers, University of Minnesota professor of public health and retiring president of the Mississippi Valley Tuberculosis conference, addressed the conference's meeting in Chicago on September 8.

Dr. John C. Mickelson of Mankato was admitted to the fellowship of the American College of Surgeons, in New York on September 12. Doctors admitted to the college numbered 762. Among them were, in addition to Dr. Mickelson, 29 Minnesota surgeons: B. Marden Black, Rochester; Theodor E. Bratrud, Thief River Falls; Henry C. Dahleen, Rochester; Gilman H. Goehrs, St. Cloud; Gustaf A. Hedberg, Nopeming; Edward S. Judd, Sr., Rochester; Leonard L. Kallestad, Brownton; Paul R. Lipscomb, Rochester; Orval L. McHaffie, Duluth; Frank H. Russ, Rochester; Oliver E. Sarff, Duluth; James S. Spang, Duluth; H. Herman Young, Rochester.

Dr. H. O. Halvorsen, associated with the University of Minnesota bacteriology department for 24 years, has been named acting administrative head of the department, Dr. Harold S. Diehl, dean of the medical school, announced September 11. He will succeed Dr. Robert G. Green, who died September 6.

Named a one-man commission by the Rockefeller Foundation, Dr. Irvine McQuarrie, Minneapolis, head of the pediatrics department at the University of Minnesota medical school, left for Japan September 16 for a three-month survey of medical education and practice.

Dr. Einar C. Andreassen, chief of medical service for the veterans administration Fort Snelling branch office, Minneapolis, received an award from the British ambassador for service in the Normandy invasion.

Deaths

Dr. Lloyd J. Nelson, 37, native of Sioux Falls, South Dakota, died July 23 at the veterans hospital at Hot Springs.

Dr. C. P. Farnsworth, 75, founder of the Chamberlain Hospital and Sanitarium, South Dakota, died at Courville, California, August 14.

Dr. F. B. Alcott, 69, who practiced in Chamberlain, South Dakota, from 1930 to 1945, died at Pasadena, California, on July 18.

Dr. A. J. Struble, 75, of Centerville, South Dakota, where he practiced for 45 years, died August 25.

Dr. Charles D'Arcy Wright, 83, Minneapolis physician for 50 years, died July 23.

Dr. John E. Crewe, Rochester, Minnesota, died July 22 on his 75th birthday. He had practiced in Rochester for 45 years and retired as Olmsted county coroner last year after serving for 36 years.

Dr. Llewellington D. Peck, 69, physician at Hastings, Minnesota, for more than 45 years, died in Rochester in July.

Dr. Charles M. Kistler, 77, Minneapolis physician and surgeon from 1900 until his retirement three years ago, died July 8.

Dr. Reinhart G. Olson, 67, Minneapolis, died in July. He was a member of the Swedish hospital staff from 1919 until he retired in 1944.

Dr. Alfred N. Bessesen, 77, retired Minneapolis surgeon, died August 19. He was a former professor of anatomy at Hamline university, St. Paul, and the first president of the staff of Asbury hospital, Minneapolis.

Dr. Robert G. Green, 52, University of Minnesota professor, known internationally for his original research on cancer and virus diseases, died September 6. At the time of his death, Dr. Green was working on what he hoped would be a successful vaccine against poliomyelitis and on an agent to immunize against cancer.

Dr. Julius F. Gendron, 79, health officer, and a practicing physician at Grand Rapids, Minnesota, since 1904, died September 11. A native of St. Francis, Canada, he was at one time poet laureate of Canada.

Advertisers' Announcements

SALT SUBSTITUTE BY WINTHROP

People who cannot or should not use salt may now at least have the savor. Meeting newest medical concepts of salt-free diets, scientists of the Winthrop Chemical Company, Inc., have developed a new salt substitute. Called Neocurtasal, the product is sold in retail drug stores.

Most interested in Neocurtasal will be those the medical profession term "hydrated individuals." They are the people whose tissues store abnormal quantities of water. They swell, become fat, unless put on a diet of restricted salt and fluids. Cardiac, renal and other diseases associated with edema call for similar treatment. The new product contains no sodium. It has a salty flavor, however, is palatable, flows freely, and is used in the same manner as salt. It is being distributed in 2-ounce shakers and 8-ounce bottles.

The product is described as "odorless, white, crystalline, some hygroscopic powder, consisting of potassium chloride, ammonium chloride, potassium formate, calcium formate, magnesium citrate and starch."

SHARP & DOHME PATENT OFFICE DECISION

Since 1936, when Colebrook and Kenny, British scientists, proved clinically that sulfanilamide had the activity of the German product, prontosil, chemists of academic and industrial laboratories have been busy searching for new, improved sulfa drugs. The completely ideal sulfa drug has not been discovered, and the search continues.

The patent office, having received several patent applications, including one from Sharp & Dohme, made the following decisions: (1) To Sharp & Dohme, as the first to synthesize any pyrimidine derivative of sulfanilamide, the dominant position on all sulfapyrimidines, which include sulfamerazine, sulfadiazine, and the lesser known (not generally used) sulfamethazine. (2) To another applicant a specific claim on sulfadiazine, since they were the first to synthesize this particular derivative. (3) To Sharp & Dohme additional specific claims on alkyl substituted sulfapyrimidines, such as sulfamerazine and sulfamethazine.

With its newly acquired position in the sulfapyrimidine group to add to the two latest intestinal sulfonamides, "Sulfasuxidine" succinylsulfathiazole and "Sulfathalidine" phthalylsulfathiazole, both products of its medical research division, and its share in the development of sulfathiazole (an earlier but still widely used sulfonamide), Sharp & Dohme has made major contributions to the development of five of the eight sulfa drugs in general use today. (The eight are: sulfanilamide, sulfapyridine, sulfathiazole, sulfadiazine, sulfaguanidine, sulfamerazine, "Sulfasuxidine", "Sulfathalidine".)

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MERCK AWARD WINNERS

The National Research Council has made the initial five awards under a $100,000 fund established by Merck & Co., Inc., to provide promising young scientists with further research training in the closely allied fields of chemistry and biology.

Many scientific problems are so complex that combinations of skills are needed, and the purpose is to help foster the development of scientific leaders with broad competence in the natural sciences. The selections, made by the Council's Merck Fellowship Board, are: Joseph Lein, New York City, for advanced study at the California Institute of Technology on the specificity of enzymes produced by mutated and non-mutated genes in Neurospora; Nevin Stewart Scrimshaw of Rochester, New York, for a biochemical study at the University of Rochester of factors associated with toxic complications of pregnancy and fetal abnormalities; Lorin John Mullins of Palo Alto, California, for advanced work at the Naples (Italy) Zoological Station on the experimental modification of permeability phenomena in marine vertebrates and invertebrates; Arthur Beck Pardee of Pasadena, California, for researches at the University of Wisconsin in general physiology, histology, cytology and related fields as preparation for a career in medical research; and B. Roger Ray of Nampa, Idaho, for work at the Rockefeller Institute for Medical Research, New York City, on the determination of movements of salts through certain nonaqueous solutions by means of high speed centrifugation, the results of which will apply to the problem of cell permeability.

These first Merck Fellowships are for the year 1947-48. The recipients were selected from a field of forty-nine applicants. One of the members of the Merck Fellowship Board is Dr. Rene J. Dubos, Rockefeller Institute for Medical Research. Dr. Dubos was the first JOURNAL-LANCET lecturer at the University of Minnesota Medical School.

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New Series

The Indications for Bone Graft Fracture Treatment

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Sioux Falls, South Dakota

Most fractures can be treated successfully by one of the various closed methods. In contrast, the results with closed treatment in a certain small group of fractures are unsatisfactory; bony union is weak, delayed or permanently absent, or it may occur in malposition. It is in this relatively small second group of cases that bone graft procedures form a valuable adjunct in the treatment of fractures. The bone graft, properly used, not only stimulates new bone formation but also affords an excellent means of internal fixation of the fractured fragments. Such procedures should be performed only in the absence of infection or undue scarring of the overlying tissues, and under the most rigid conditions of aseptic technic; even then the operative procedure may activate a quiescent infection in an old compound fracture, resulting in further disability extending into a long period. Preliminary skin procedures, such as a pedicle graft, may be necessary to avoid postoperative necrosis of the overlying avascular scar tissue and subsequent infection of the bone beneath.

In the selection of the type of treatment in a given fracture case, due consideration must be given to the patient's physical condition and age, and certain other factors.[3] The indiscriminate use of bone grafting operations as well as the various types of grafts can only lead to surgical disasters. In recent years there have appeared certain well-defined indications for a bone graft in fracture treatment.[1,4] Under ideal conditions a successful outcome can be anticipated in a high percentage of cases.

Delayed Union

Excellent reduction and immobilization of a fracture may occasionally be followed in several months by only minimal callus formation. Interruption of the nutrient artery with local loss of blood supply is often a factor in such cases. At the end of six months, little or no new bone is evident and the fragments are freely movable at the fracture site (as shown in Fig. 1). In such cases the prospect of early union with further immobilization is not good; nonunion may occur and partial ankylosis of the adjacent joints occasionally follows as the result of prolonged immobilization. A bone graft procedure stimulates callus and bony union (Fig. 2); active mobilization of the adjacent joints (Fig. 3) is then undertaken at the earliest practical date.

Nonunion

Rarely, cases are seen in which little or no callus occurs, and in which it is or becomes evident that bony

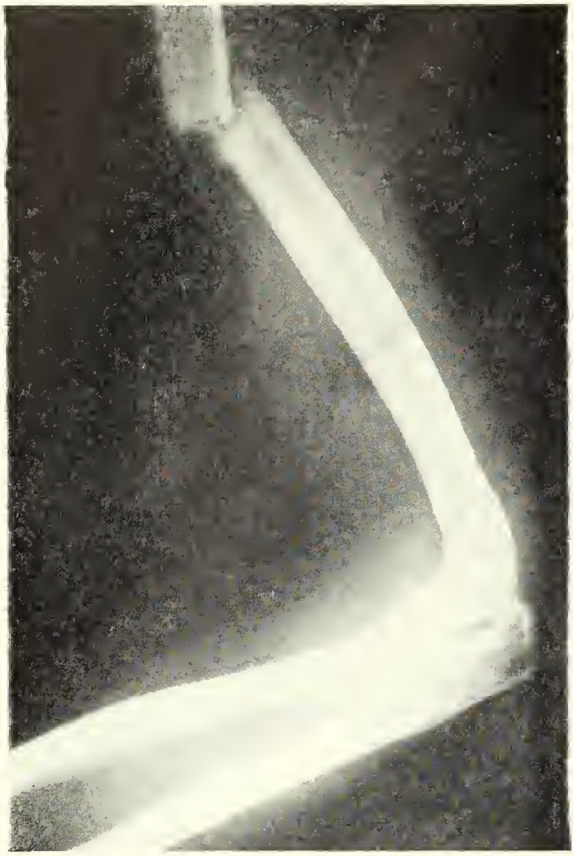

Fig. 1. Roentgenogram of humeral fracture six months old, to show maximum mobility present with minimal callus at fracture site. The musculo-spiral nerve, adjacent to the fracture, was intact. Previous treatment consisted of a hanging cast for two months, followed by immobilization in a plaster of paris shoulder spica for four months in good position.

union will not occur regardless of the duration of further immobilization (Fig. 4). A false joint frequently forms between the old fracture surfaces. In such cases treatment by means other than a bone graft (Figs. 5, 6) is futile.

MALUNION

In the usual fracture exact anatomic restoration of the fractured fragments is not necessary for a good result. However, where the alignment of the adjacent joints is grossly disturbed (as at the two radio-ulnar joints of the forearm in Fig. 7), or where bowing and shortening occur, severe loss of function results, in addition to deformity. The condition may follow early discontinuance of immobilization, the soft new callus yielding to the constant pull of the active adjacent muscles. In such cases correction of the deformity should be followed by a suitable bone graft (Fig. 8). The use of bone graft in old malunited vertebral fractures seldom results in complete alleviation of symptoms. In case of malunited fractures involving articular surfaces, arthrodesis is frequently facilitated by a bone graft.

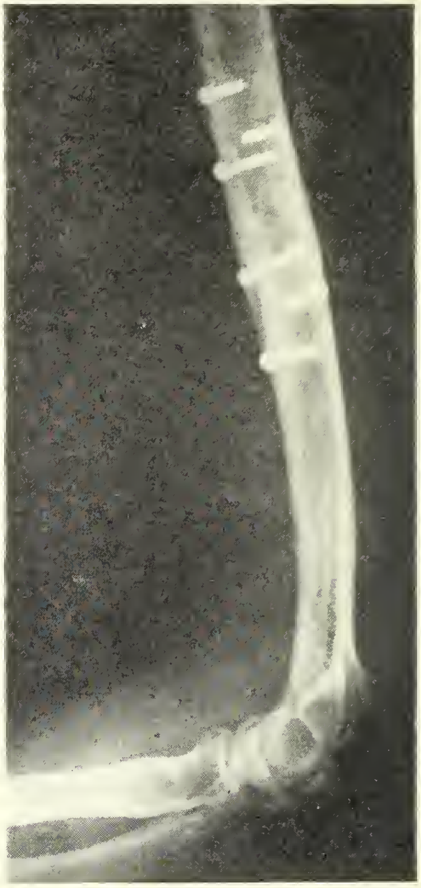

Fig. 2. Postoperative roentgenogram of same case shown in Fig. 1.

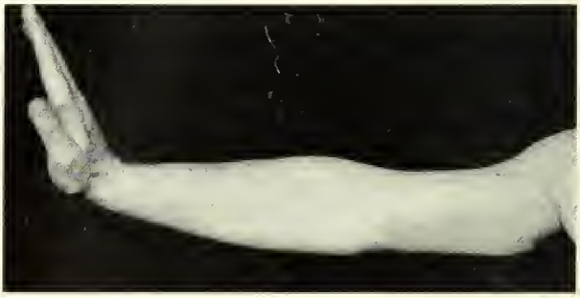

Fig. 3. Postoperative functional result of same case as Fig. 1, showing the full range of extension of the elbow, wrist, thumb and fingers; complete flexion was also present.

DELAYED OPEN REDUCTION OF RECENT FRACTURES

The inherent effort of injured tissue to repair is typically seen in fractures where the fracture hematoma early becomes loosely organized by fibrous tissue proliferation; the subsequent callus is remodelled into the normal osseous structure. This effort to repair is maximal immediately after the fracture and diminishes with the age of the injury. Open reduction several weeks

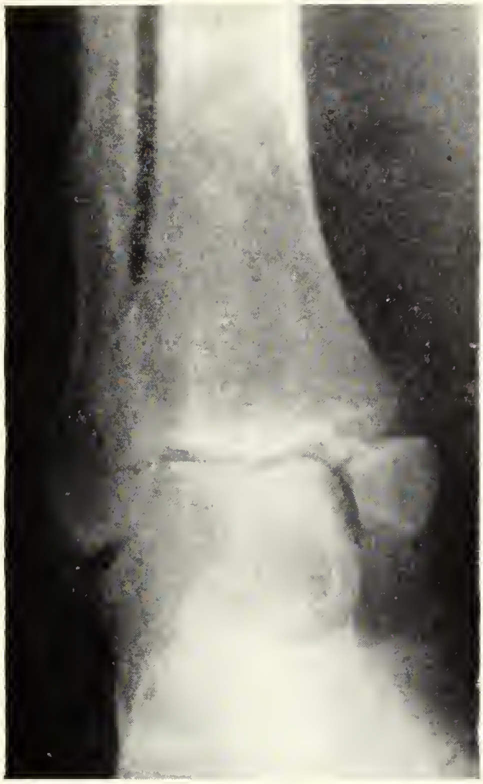

Fig. 4. Nonunion of medial malleolus several months old with absorption of bone at fracture site. Patient gave a history of having been immobilized in a cast for two months following original fracture.

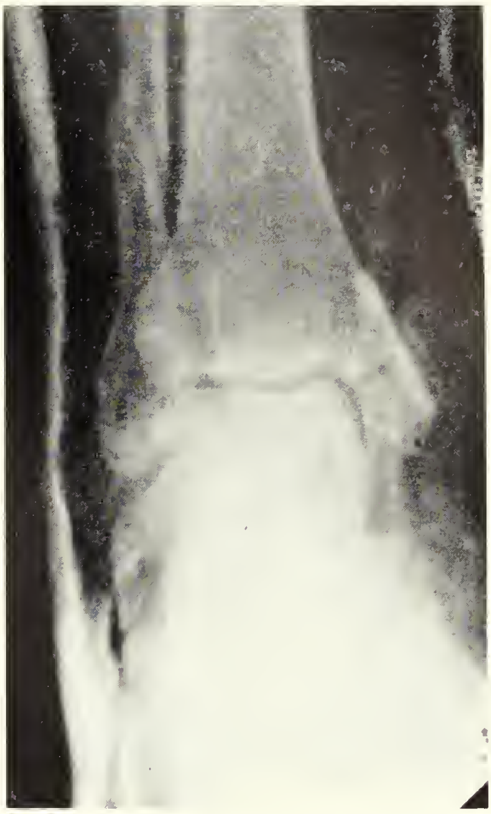

Fig. 5. Immediate postoperative result in same case following inlay bone graft and plaster of paris immobilization.

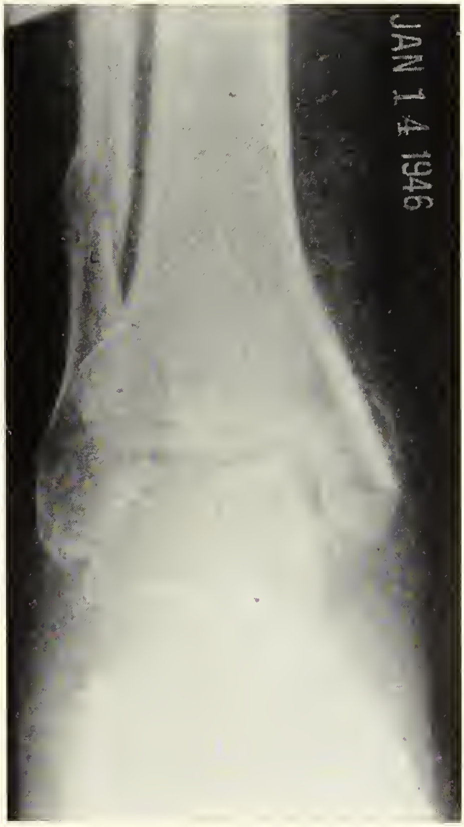

Fig. 6. Condition on removal of cast; complete relief from previous symptoms of pain and instability.

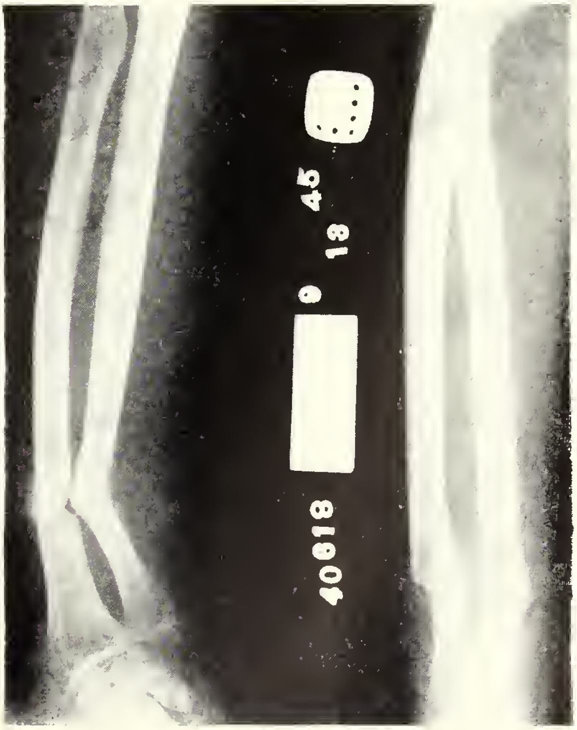

Fig. 7. Roentgenogram referred with patient—malunited fractures of the radius and ulna. Marked loss of radio-ulnar movements as a result of malposition of superior and inferior radio-ulnar joints which normally rotate in parallel planes.

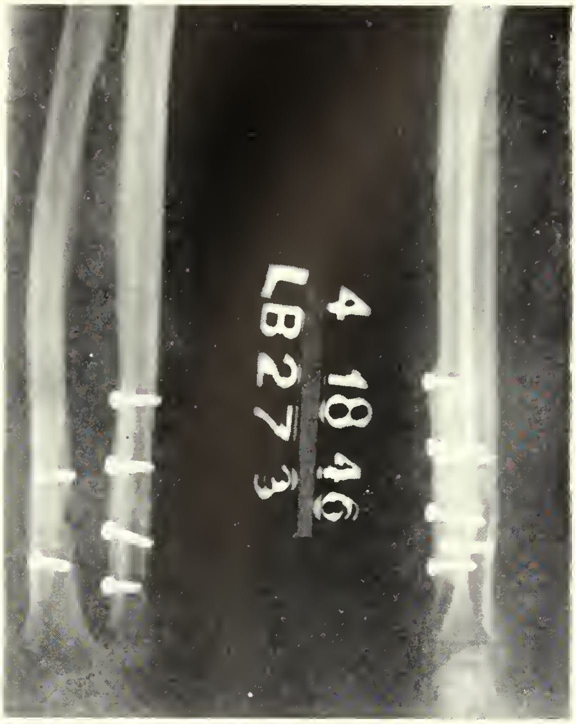

Fig. 8. Postoperative roentgenogram in same case shown in Fig. 7. Excellent functional result.

after the fracture removes any callus which may have formed between the fracture surfaces; the stimulus to new bone formation has already been spent in the preceding weeks, and delayed and nonunion are frequent clinical results. In such cases a bone graft will lend the osteogenic element which is otherwise minimal.

Other Conditions

Only rarely are bone graft procedures indicated in the treatment of fractures other than previously noted. Where bony union progresses only to a limited degree, so that full function cannot be allowed because of the danger of refracture, a bone graft will give added strength to a point of weakness.[2] In the event a defect of bone exists as a result of bone loss in a compound injury, massive grafts may be used to fill in the defect. Such long bone grafts may fracture many months after the operation; their use should be limited to those cases where more appropriate operative measures are not available.

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HEALTH IN THE UNITED STATES, FIRST HALF OF 1947

The general health of the people of the United States, maintained during the war years at a higher than prewar level, continued favorable during the first six months of 1947, Federal Security Administrator Oscar R. Ewing announced.

The reported incidence of most of the important communicable diseases, the crude death rate, the maternal and infant mortality, and the specific death rates for certain diseases indicate as good health conditions in the United States during the first half of 1947 as in 1946, if not slightly better, according to Public Health figures, Mr. Ewing pointed out.

Lower incidence than for the same period last year was reported in the first half of 1947 for diphtheria, the dysenteries, malaria, measles, meningococcus meningitis, mumps, poliomyelitis, scarlet fever, smallpox, typhoid fever, and typhus fever. Increases were reported for chickenpox, influenza, septic sore throat, tularemia, undulant fever and whooping cough.

On the basis of a 10 per cent sample of death certificates, the National Office of Vital Statistics reports lower death rates for tuberculosis, pneumonia and influenza (combined), the common communicable diseases of childhood, and syphilis. Although more cases of influenza were reported in the first six months of 1947 than for the same period in 1946, the estimated death rate for influenza and pneumonia (combined) for this period in 1947 was 55.8 per 100,000 population, or 5 percent below the rate of 58.9 in 1946.

Cooper's Ligament Herniotomy

V. G. Borland, M.D.,* and J. H. Graham, M.D.†

Fargo, North Dakota

Recent reports in the surgical literature indicate that the anatomic studies of McVay[1] on the inguinal region are stimulating more widespread use of the so-called "Cooper's ligament herniotomy." After painstaking dissections on over 300 cadavers he concluded that the inguinal ligament is neither the normal insertion of the inguinal strata (transversus abdominis or transversalis fascia) nor a suitable substitute for such attachment. Furthermore, he suggested that the use of the inguinal ligament as the anchoring line, as has been commonly practiced in the multitude of suggestions for inguinal hernia repair throughout the years, serves only to weaken the structure in Hesselbach's triangle where recurrences are most commonly found. McVay therefore suggested restoration of the normal attachment of the transversus abdominis and transversalis fascia to Cooper's (superior pubic) ligament as the essential feature of inguinal hernia repair, Cooper's ligament being readily accessible, intrinsically strong and directly fixed to bone. McVay felt this procedure equally suitable for large indirect and direct inguinal hernias as well as femoral hernias. After utilizing Cooper's ligament in inguinal hernia repair, one becomes convinced of the value of these suggestions and feels that this procedure more truly defines a competent floor and posterior wall for the new inguinal canal, especially if one visualizes the patient in the erect position.

There remains, however, the occasional subject in whom the structures to be approximated to Cooper's ligament (transversus abdominis and transversalis fascia) are poorly defined and attenuated, and a large gap exists between them and Cooper's ligament so that even a relaxing incision in the rectus sheath will not permit sutures to be taken without tension. Harkins[2] and others have warned against using red muscle (internal oblique) in this repair.

For these reasons it was with considerable interest that the authors noted a report by Mattson[3] suggesting fashioning a boomerang shaped flap of anterior rectus sheath, reflecting it inferiorly and suturing it to the superior pubic ligament. He considered this to be indicated in (1) direct inguinal hernias, (2) indirect inguinal hernias where the fascia of Hesselbach's triangle, as shown by the palpating finger within the abdomen is weak or greatly redundant, (3) recurrent inguinal hernias, and (4) femoral hernias.

Halsted[4] suggested the use of an anterior rectus sheath flap, but sutured it to Poupart's ligament, and Keynes,[5] a British surgeon, advised in 1937 the approximation of an anterior rectus sheath flap to Cooper's ligament for treatment of femoral hernias, but apparently failed to realize its value in inguinal hernias.

After utilizing Mattson's suggestion on a few occasions, it seemed to be such a uniformly satisfactory one that it was decided to adapt it to all hernias in the inguinal region, except in infants and children. This has been done since April, 1946. This small series is composed of 61 cases and constitutes the basis of this report.

Description of procedure: Mattson suggested that an incision placed slightly more medially and superiorly to the usual hernia incision will improve the exposure. Scarpa's fascia and the external oblique aponeurosis are divided in the usual way and the cord elevated. The sac is identified, isolated and opened. If the sac is complete and envelopes the testicle, it is divided, the distal portion is allowed to remain *in situ.* Edema and pain in the testicle postoperatively have been absent if the portion of the sac which surrounds the testicle is not disturbed.

Careful palpation of the posterior wall of the inguinal canal is then done from within the peritoneal cavity to identify a direct sac if present, or an unusual redundancy in this area. If a direct sac is present it is converted into an indirect one lateral to the epigastric vessels by careful gauze dissection. The sac is closed high with two purse-string sutures of cotton, the excess portion then being excised. The stump is allowed to retract. If a defect in the transversalis fascia is present here it is carefully closed.

The superior pubic ligament is then identified by palpation and exposed from the pubic spine medially to the femoral vessels laterally. This sometimes is somewhat tedious and seems more safely accomplished with gauze dissection. Care must be exercised to avoid injury to the femoral vein which is retracted laterally with the left index finger. Bleeding is usually absent or minimal during this dissection, and never has been troublesome. The superior leaf of the external oblique aponeurosis is retracted medially and the anterior rectus sheath incised obliquely down to within a centimeter of the pubic spine (Fig. 1). With care both the ilio-hypogastric and the ilio-inguinal nerves can be preserved.

The flap of anterior rectus sheath thus outlined is then reflected inferiorly and approximated to the Cooper's ligament with interrupted sutures of fine linen beginning laterally close to the femoral vein, the femoral vein again being retracted laterally with the finger (Fig. 2). We have used a rather stout round needle wtih a short curve (Butler's cervix needle) at this point, feeling it easier thus to avoid injury to the femoral vein, the point of the needle being directed medially away from the vein. These sutures are continued medially to the pubic spine.

The most lateral portion of the anterior rectus sheath flap is then sutured to Poupart's ligament, just anterior

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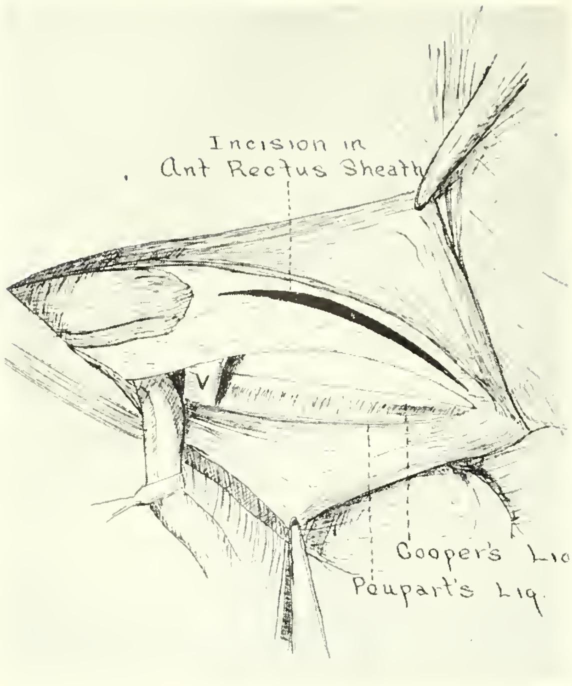

Fig. 1. Composite drawings showing the section down to Cooper's ligament and incision in anterior rectus sheath.

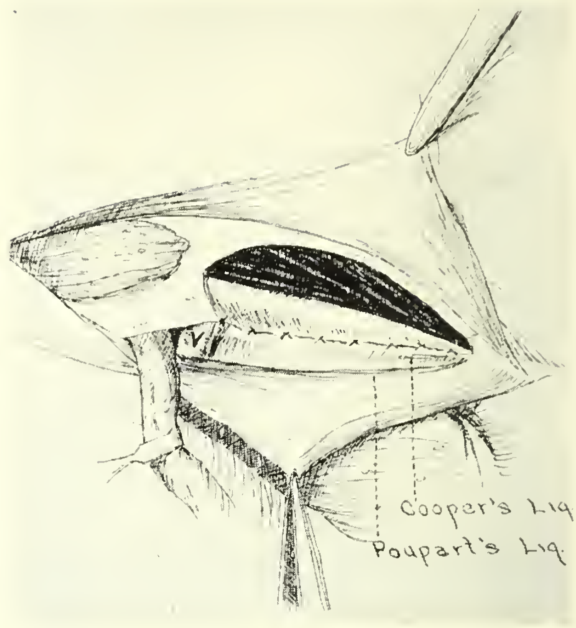

Fig. 2. Anterior rectus sheath flap turned down and sutured to Cooper's ligament. This is diagrammatic. Actually, Cooper's ligament is shown too long. Usually, four sutures suffice to approximate Cooper's ligament and the anterior rectus sheath flap.

to the femoral vessels up to the level of the internal ring. This step may be unnecessary, but it is at this point that we are careful to obtain a snug closure about the internal ring. At first we imbricated the two leaves of the external oblique aponeurosis beneath the cord, at the same time tacking it to the underlying structures. This has been abandoned in later cases as it was difficult to obliterate a small dead space medially which is occupied by the cord if the aponeurosis of the external oblique is sutured external to the cord. Also a slight persistent tenderness postoperatively was thought to be due to the subcutaneous position of the cord.

Cotton sutures were used throughout except for the use of fine linen to approximate the anterior rectus sheath flap to Cooper's ligament as previously described. All patients were operated under sodium pentothal and curare anesthesia, it being our impression that less voiding difficulties are present with this combination than with spinal anesthesia. All patients were out of bed on the second postoperative day and dismissed from the hospital on the fifth, sixth, or seventh postoperative day.

At the time of this writing (July, 1947), 61 cases have been repaired by this method. Of these, 53 were indirect inguinal hernias, 4 were direct inguinal hernias, and 4 were femoral hernias. There were 4 instances of incarceration, none of strangulation. In no case were there any wound complications, and in no instance was there evidence of disturbance in the femoral vein. All cases were examined at the end of six weeks, and no evidence of weakness in the wound was found. In fact, considerable satisfaction is gained by the examiner at this postoperative visit inasmuch as no impulse whatever can be felt at the external ring. The repair seems much more solid than after other types of hernia repair.

Obviously no claim can now be made as to ultimate results, more time must elapse before final evaluation. However, no instance of recurrence has come to our attention. It is our belief that the surgical repair herein described offers a very satisfactory method for all hernias in the inguinal region.

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Acknowledgment is hereby made and thanks expressed to Dr. G. A. Dodds for permission to include his cases in this report.

Megaloblastic Anemia in Infants

Robert A. Aldrich, M.D., and Edward N. Nelson, M.D.*

Minneapolis, Minnesota

It is now clear that there exists a syndrome of macrocytic anemia in infants which is not uncommon and which may easily be mistaken for pernicious anemia on the basis of blood morphology alone. This has been the subject of a number of reports in the literature.[1-7] Many of these cases have been reported as pernicious anemia occurring in infancy or an anemia which closely resembled it. In only a few instances have the rigid criteria for the diagnosis of pernicious anemia been fulfilled. As pointed out by Dunn and Peterson,[8] pernicious anemia in young children is exceedingly rare. Recently Zuelzer and Ogden published a comprehensive report on this disease.[9] They considered this anemia to be a distinct entity, with a number of etiologic factors, and have suggested naming it megaloblastic anemia of infants. The pathologic changes and the criteria for diagnosis, together with a detailed discussion, are delineated fully in their paper. It is notable that nearly everyone writing about this syndrome has considered nutrition an important etiologic factor. Some have inferred that goat's milk alone may produce this disease in infants receiving a goat's milk diet.[10] However, no one has been able to demonstrate the specific defect in nutrition.

During the eight-month period between October 1, 1946, and June 1, 1947, we had occasion to care for six infants ranging in age from six to nine months who presented the typical syndrome of infantile megaloblastic anemia. Review of local hospital records prior to that period revealed a number of similar cases not included in the present report. Because the dietary histories were so strikingly uniform in these six unselected case studies, as were the age range, clinical course, and laboratory findings, the results of our observations are offered here in support of the thesis that a defect in nutrition in many instances may play a prominent, if not indeed the primary, role in causing the peculiar dysplastic alterations of the bone marrow and blood which characterize this type of macrocytic anemia.

The degree of anemia was marked in all cases. The bone marrow showed characteristic morphological alterations involving both the red cell series (megaloblastic dysplasia) and the polymorphonuclear, neutrophilic leucocytes with abnormal lobulation and excessive segmentation of the nuclei. The morphological changes were, therefore, virtually indistinguishable from those described by Zuelzer and Ogden.[9]. The peripheral blood reflected all of these marrow changes. Macrocytosis, anisocytosis, poikilocytosis, polychromasia and hypochromasia were evident and nucleated erythrocytes were often present. Typical pernicious-anemia-like neutrophils were constantly present in the peripheral blood and definite leucopenia was found in two of the six patients. Fairly marked thrombopenia occurred in five cases. The anemia of all of these patients was relieved promptly by intramuscular administration of refined liver extract potent in anti-pernicious anemia principle. Cure appears to have been complete in every respect and there were no recurrences following withdrawal of liver therapy. In two cases especially tested, anti-scorbutic therapy alone had no effect on the reticulocyte count. Even the scorbutic signs and symptoms in the three cases showing frank scurvy appeared to be somewhat refractory to vitamin C therapy before liver extract was given.

In the case of each patient presented here the diet had consisted entirely, or almost entirely, of a standard formula made from the same synthetic milk product, which was designed to resemble human milk in its composition.* It contains vitamins A and D and the ordinary members of the B group of vitamins in supposedly adequate amounts, but no vitamin C. It is recommended by the purveyors of this product that orange juice or other source of the latter vitamin be given to supplement the formula. However, not one of the infants included in the present study had received what could be reasonably regarded as an adequate supplement of vitamin C. Three of them showed frank, and several of the others equivocal signs of scurvy. There was a complaint on admission of long-standing anorexia in all cases and the general nutritional state was found to be poor in most of them.

The clinical picture and the history in this small series of cases were strikingly similar. The typical case history is as follows: the infant, having been placed exclusively on the synthetic milk formula when between one and five weeks of age, was considered to be perfectly well up to the age of three or four months. The first outspoken symptom, anorexia, then appeared. This coincided with attempts to introduce new foods into his dietary. It was then observed that the infant steadfastly refused everything but the milk formula. Orange juice is said to have been offered but was not well taken, and so was omitted. Anorexia became worse and the infant thereafter either failed to gain or actually lost weight. At a still later stage he developed anorexia even for the milk formula, soon reducing his intake to little more than half of the previous amount. Finally, pallor was observed which progressed rapidly. The patient then manifested evidence of general decrease in vigor and marked irritability when he was handled. By this time he may have begun to show signs of regression to a lower level of development.

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*From the Department of Pediatrics, University of Minnesota, Minneapolis, Minnesota.

Presented in part to the Northwestern Pediatric Society, Bayport, Minnesota, September 26, 1947.

*Contains in dry state: Fat, 28 per cent; carbohydrate, 55 per cent; protein, 12 per cent.

TABLE 1

Summary of the History and Physical Findings at the first hospital admission.

Patient's Hospital Number	Age in Wks.	Sex	Weight in kilos.		Presenting Symptoms	Duration Symptoms in wks.	Previous Illness	Anemia in Family	Dietary History of Patient	Physical Examination	Motor Development	Roentgen Examination of Chest and Long Bones
			at birth	on adm.								
771994	33	M	3.01	5.02	Anorexia Vomiting Pallor Irritability Weakness Poor weight gain	1*	Loose Stools 4 mos. of age 2-3 days	None	Synthetic milk from birth to the present. Orange juice first offered at 5 mos. of age and very poorly taken. Rarely given crackers or soup, no other foods.	Extreme pallor Poor nutrition Costochondral beading. Splenomegaly Hepatomegaly	Cannot sit alone at age of 8 mos.	Minimal degree of scurvy
773688	35	M	4.0	6.35	Anorexia Pallor Irritability Weakness Weight loss No longer sits	14	Loose stools 6 mos. of age "cold" last 3 wks.	Anemic tendency in mother	Breast fed first 5 weeks of life. Snythetic milk till 3 weeks before admission. Cow's milk to present. Orange juice offered intermittently, poorly taken. Refused other foods.	Severe pallor Poor nutrition Costochondral beading Systolic Murmur, petechiae Spenomegaly Hepatomegaly	Sat alone at 6 mos. Cannot now.	Clubbing of ribs not diagnostic
20826	28	M	3.17	5.45	Anorexia Regurgitation Pallor Irritability Weakness Slow weight gain	8	Slight "cold" at 4 mos. of age	Two aunts tend to be anemic	Synthetic milk from the fifth day of life till one week before admission. Orange juice begun at 4 weeks of age, seldom taken. Refused other foods practically entirely	Marked pallor Poor nutrition Costochondral beading Petechiae	Cannot sit alone	Clubbing of ribs not specific
20882	33	F	2.27	4.57	Anorexia Regurgitation Pallor Irritability Weakness Weight loss	15	"cold" and cough for a week at age 3 mos.	None	Breast fed first week of life. Synthetic milk to present. Orange juice was offered irregularly and taken poorly. Refused to take other foods.	Pallor Poor nutrition Resists Handling Costochondral beading Hepatomegaly	Cannot sit alone	Minimal Changes in the long bones, not specific
776183	37	M	3.56	6.25	Anorexia Pallor Irritability Bleeding gums Slow weight gain Ecchymoses	16	Possible pneumonitis as a newborn	None	Breast fed first 3 weeks of life. Synthetic milk till present. No orange juice. Refused solid food.	Pallor Fair nutrition Costochondral beading Splenomegaly Hepatomegaly Ecchymoses	Normal	Characteristic changes of scurvy
779788	28	M	4.70	7.1	Anorexia Irritability Sore left leg	6	Sore Throat age 2 mos.		Synthetic milk from birth to present. Orange juice first 2 mos. of life, since then rarely. No other foods.	Mild pallor Fair nutrition Tender, swollen left leg Resists motion Costochondral beading	Cannot sit alone	Characteristic changes of scurvy Subperiostal Hemorrhage

* It is improbable that pathologic changes of this degree could take place in such a short period. See under discussion of case studies.

CLINICAL AND LABORATORY DATA

Table 1 presents a summary of the history and physical findings on the initial examination. Each of the six patients was hospitalized either at the University of Minnesota Hospitals or at the St. Paul Children's Hospital. All of the patients were between 28 and 37 weeks of age upon admission. Five patients were males with normal birth weights. The sixth was a female and weighed five pounds (2.27 kilo) at birth. Two of the six patients had lost weight after gaining during the first few months of life; the other four had gained weight slowly.

The presenting symptoms which were most prominent included anorexia, vomiting or regurgitation, pallor, irritability, weakness and slow weight gain or actual weight loss. Bleeding tendency was a complaint in one patient who had hemorrhages at the site of erupting teeth. Symptoms had been present for 14 to 16 weeks in three patients. Two others had been noticeably sick for from 6 to 8 weeks. In another instance, the mother exhibited marked evidences of guilt and anxiety over the very critical condition of her baby, stating that it had been ill for just one week. It is felt that she might be attempting to minimize the duration of the illness. There was a history of some type of infection in every patient. However, it did not appear to be more than one sees in the average infant. A history of anemia in the family was present in two instances.

The dietary history was quite uniform. All but two infants had been fed breast milk for a short period at the outset. The shortest time was five days and the longest was five weeks. Two patients received synthetic milk from birth, and in every infant synthetic milk made up the bulk of the diet. After the synthetic milk was started it was given exclusively up until the time of admission, excepting in two patients who were changed to evaporated cow's milk one and three weeks, respectively, before hospital admission. The intake of vitamin

Table 2

Summary of Laboratory Data on the Initial Hospital Admission

Patient's Hospital No.	Hgb. in Gm/100	Rbc in millions cc. per cu. mm.	Hematocrit in percent	Platelets per cu. mm.	Reticulocytes percent	Wbc per cu. mm.	Differential White cell count					MCV	MCH	MCHC	Morphology of the peripheral blood
							PMN	LYM	MONO	EOS	BAS				
771994	4.3	1.15	12	30,000	4.5%	8,300	25	67	4	4	–	104	37	35	macrocytosis poikilocytosis anisocytosis basophilic stippling nucleated rbc 28/100 wbc hypersegmented neutrophils
773688	3.2	0.94	11	64,000	3.9%	11,400	29	58	11	2	1	117	34	29	macrocytosis poikilocytosis anisocytosis nucleated rbc 13/100 wbc
20826	4.9	1.73	—	96,000	1.2%	11,100	57	45	3	–	–	—	28	—	macrocytosis poikilocytosis anisocytosis nucleated rbc 10/100 wbc hypersegmented neutrophils
20882	5.9	2.11	17.4	73,000	2.0%	4,700	20	80	–	–	–	82	27	33	macrocytosis poikilocytosis anisocytosis nucleated rbc present hypersegmented neutrophils
776183	5.0	1.86	—	126,000	1.5%	4,500	15	85	–	–	–	—	26	—	macrocytosis poikilocytosis anisocytosis several megaloblasts hypersegmented neutrophils
779788	9.5	2.8	34	234,000	0.5%	18,200	49	47	3	1	–	121	34	28	macrocytosis poikilocytosis anisocytosis hypersegmented neutrophils

C was grossly inadequate in each instance. Solid foods were conspicuous by their relative absence from the diet, largely because they were refused by the infants or were offered irregularly or not at all. The initial physical examination demonstrated definite pallor in all cases. Substandard nutrition and beading of the ribs was noted in all patients. Splenomegaly and hepatomegaly were frequently present. Four patients showed hemorrhagic tendencies in the form of petechiae, gum hemorrhages, ecchymoses or subperiosteal hemorrhage. Four patients showed slowing or regression of the motor development sequence. Two showed normal motor development. Roentgen examination of the chest and long bones showed changes in all instances. Three were diagnostic of scurvy; the others did not have specific enough changes to be diagnostic of this disorder.

Table 2 is a summary of the laboratory data at the time of admission to the hospital. The anemia was severe in most cases. The platelets were markedly reduced in every case but one. An increased percentage of reticulocytes was present in four patients. There was a leukopenia in two patients. The erythrocytes on the peripheral blood smear showed macrocytosis, poikilocytosis and anisocytosis. Nucleated red cells were nearly always present. Hypersegmented neutrophils were frequently seen. Wherever serum protein determinations were carried out they were found to be low. Two patients showed abnormal numbers of red cells in the urine and one had a trace of albumen.

Table 3 is a summary of results from studies of the sternal bone marrow before and after liver therapy. The bone marrow showed a characteristic hyperplasia, the erythrocytes developing in the megaloblastic series. Platelet depression and the presence of abnormal polymorphonuclear neutrophils were noted. The eosinophils and the lymphoid series of cells were normal. Repeated studies of the bone marrow after liver therapy showed a return to normal morphology.

Comment and Summary

Zuelzer and Ogden made an outstanding contribution by establishing megaloblastic anemia in infancy as an entity on a sound basis. They regarded this anemia as the result of deficiency of a hematopoietic factor derived from "folic acid" or purified liver extract. The disease differs from pernicious anemia in adults by the complete

TABLE 3

Summary of Sternal Bone Marrow Studies upon Hospital Admission and following Liver Therapy

Patient's Hospital Number	Erythropoiesis	Neutrophils	Eosinophils	Lymphoid Series	Status of Bone Marrow or Peripheral Blood following Liver Therapy
771994	60% Erythroblasts of reticular origin	16% Premature segmentation of the nucleus in some neutrophils	2% Normal	22% A few lymphocytes of reticular origin	Normal Bone Marrow
773688	50% Development at the promegaloblastic and basophilic megaloblastic stages	25% Premature segmentation of the nuclei	4% Normal	21% Normal Lymphocytes	Normal Bone Marrow
20826	61% Developing erythrocytes are in the promegaloblastic and basophilic megaloblastic stages	18% Hypersegmented neutrophils	1% Normal	20% Normal	Normal Peripheral Blood
20882	58% Developing erythrocytes are in the basophilic megaloblastic stages	19% The neutrophils are hypersegmented	2% Normal	21% Normal	Normal Peripheral Blood
776183	59% Development of the erythrocytes is in the promegaloblastic and basophilic stages	18% Premature segmentation of the nuclei	4% Normal	19% Normal	Normal Bone Marrow
779788	59% Megaloblasts are in the basophilic and polychromatic stage	21% Hypersegmented nuclei	4% Normal	20% Normal	Normal Bone Marrow

and lasting cure affected, no relapses having been observed.

The present report of six infants suffering from anemia of the megaloblastic type is in agreement with Zuelzer and Ogden's observations. They considered infection and nutritional deficiency as possible etiologic factors. Our experience places emphasis on nutritional factors, because there was only an ordinary incidence of mild infections in our patients. The diets were uniform in composition and in addition regularly deficient in ascorbic acid. The variety of diets received by Zuelzer's patients made it impossible to point to a particular one; the high incidence of ascorbic acid deficiency encountered was considered as merely indicative of "the frequency of dietary inadequacies." The fact that megaloblastic anemia has developed with a wide variety of diets points to a combination of factors which may cause a deficiency in some hematopoietic principle, such as qualitative or quantitative defects in the diet, abnormalities in absorption or metabolism, the presence of inhibitors or antagonists, infection, predisposing conditions of age, race and prenatal maternal nutrition. The restricted dietary regimen of our patients offers somewhat more clearly defined limits within which a search for a specific nutritional etiology may be conducted. An extensive clinical and experimental investigation of this aspect of the problem is now underway in this clinic.

The discovery of six cases of infantile megaloblastic anemia in the short period of eight months in one clinic indicates the necessity of the physician's being on the alert to recognize this type of anemia in infants. In order to advance our knowledge regarding the pathogenesis and prevention or treatment of this form of anemia, it is necessary to examine the bone marrow in all suspected cases.

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The Combined Effect of Streptomycin and para-Aminosalicylic Acid on Experimental Tuberculosis in Mice

Guy P. Youmans, Ph.D., M.D., Anne S. Youmans, Ph.D., and Rollin R. Osborne, M.D.*

Lehmann [1,2,3] demonstrated that para-aminosalicylic acid (4-amino-2-hydroxy benzoic acid) was highly effective *in vitro* for the suppression of growth of tubercle bacilli and possibly active in retarding experimental tuberculosis of guinea pigs. Youmans [4] and Youmans, Raleigh and Youmans [5] found that para-aminosalicylic acid was bacteriostatic *in vitro* for 17 strains of virulent human type tubercle bacilli and was moderately effective for the suppression of experimental tuberculosis of mice. In view of the results of Smith and his collaborators [6,7,8,9] which indicated that treatment of experimental tuberculosis of guinea pigs and rats with streptomycin in combination with one of several sulfone compounds resulted in a chemotherapeutic effect greater than that obtained with either agent alone, it seemed desirable to determine whether streptomycin in combination with para-aminosalicylic acid would give a similar effect.

Methods

Mice were infected intravenously with 0.1 mgm. of the H37Rv strain of human type tubercle bacillus as described previously.[10] The mice were divided into five groups (Table 1) and treated with streptomycin or para-aminosalicylic acid or with the two in combination. The streptomycin was administered subcutaneously twice daily, the injections being eight hours apart. The para-aminosalicylic acid was given by the drug diet method.[4,5] Treatment was continued for 28 days in the first experiment and for 42 days in the second experiment. At the end of the treatment period the surviving mice were sacrificed, viscera fixed in formaldehyde, and the lungs examined grossly and microscopically for evidence of tuberculosis. The amount of tuberculosis present was estimated and recorded as previously reported.[5] At the time of autopsy portions of the lungs were also cultivated to detect the presence of viable tubercle bacilli.

Results

Table 1 shows the results obtained following administration of streptomycin and para-aminosalicylic acid to mice infected with tubercle bacilli. The amounts of streptomycin and para-aminosalicylic acid used in this experiment were such that when used alone only partial suppression of the disease resulted. This, of course, was necessary in order to detect any additive or potentiating effect with combined therapy. When the two substances were used together it was obvious that the amount of tuberculosis was significantly less than when used separately.* The results with combined therapy, however, were essentially the same as with 3000 micrograms of streptomycin alone.

Table 1

The Effect of Combined Treatment with Para-aminosalicylic Acid and Streptomycin on Experimental Tuberculosis of Mice

Treatment	Number of Mice	Percent Mortality	Amount of Gross Pulmonary Tuberculosis
Streptomycin, 750 micrograms per day	15	6.66	2.8+
PAS—1% in diet	15	0.0	2.3+
PAS—1% plus Streptomycin, 750 micrograms	15	0.0	0.9+
Streptomycin, 3000 micrograms per day	10	0.0	0.7+
Controls	20	60.0	3.9+

Table 2

The Effect of Combined Treatment with Para-aminosalicylic Acid and Streptomycin on Experimental Tuberculosis of Mice

Treatment	Number of Mice	Percent Mortality	Amount of Gross Pulmonary Tuberculosis
Streptomycin, 750 micrograms daily	15	0.0	3.2+
PAS—1% in diet	14	0.0	1.8+
Streptomycin, 3,000 micrograms daily	14	0.0	0.5+
PAS—1% plus Streptomycin, 750 micrograms	15	0.0	0.5+
PAS—1% plus Streptomycin, 3,000 micrograms	14	0.0	0.3+
Controls	12	16.6	3.8+

This experiment was repeated and the results are shown in Table 2. Treatment of the animals in this experiment was continued for a period of six weeks, since no deaths had occurred in the control animals at the end of 28 days. Whether this was the result of a reduction in virulence of the culture used at this time or the result of an error in the dosage is not known.

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*Incomplete experiments being conducted by Dr. William H. Feldman and associates at the Mayo Foundation on the effect of the combined treatment of tuberculous guinea pigs with streptomycin and para-aminosalicylic acid indicate that this form of therapeutic attack on tuberculous infections is worthy of further exploration.[11]

However, two controls died during the sixth week and at autopsy all controls had extensive pulmonary tuberculosis. The results in this case with streptomycin and para-aminosalicylic acid combined were essentially similar to those obtained in the first experiment. A group of animals was included in this experiment which were given 1.0 per cent para-aminosalicylic acid plus 3000 micrograms of streptomycin daily. There was some indication that this group of animals exhibited a better therapeutic response than those receiving para-aminosalicylic acid and 750 micrograms of streptomycin daily. In both experiments the amount of tuberculosis present upon microscopic examination paralleled that present macroscopically and lesions of the proliferative type predominated in all treated animals, whereas the control animals showed mainly necrotic-exudative lesions.[5]

Viable tubercle bacilli were obtained by culture from all mice regardless of the type of treatment.

DISCUSSION

The results indicate that the therapeutic effect was greater when streptomycin and para-aminosalicylic acid were given in combination than when either, in the doses used, was given separately. They do not, however, furnish any evidence of a marked potentiation of chemotherapeutic effect. This is in line with the fact that when streptomycin and para-aminosalicylic acid are combined and tested *in vitro* the increase in bacteriostasis is only additive.[5] Since the usefulness of para-aminosalicylic acid for the treatment of clinical tuberculosis is not known, the importance of these results in relation to the treatment of tuberculosis of humans can be only a subject for speculation. However, should para-aminosalicylic acid permit the use of smaller therapeutic doses of streptomycin, thus reducing the toxic effects of the latter, its role would be of considerable significance.

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MEETING OF AMERICAN ACADEMY OF DERMATOLOGY AND SYPHILOLOGY

The sixth annual meeting of the American Academy of Dermatology and Syphilology will be held in Chicago from Saturday, December 6, through Thursday, December 11, it is announced by Dr. Earl D. Osborne, secretary-treasurer of the Academy, 471 Delaware Ave., Buffalo, New York.

The principal sessions will be held at the Palmer House, with special courses in histopathology and mycology scheduled for Saturday and Sunday, December 6 and 7, at the Medical Schools of the University of Illinois and Northwestern University. Teaching clinics will be held at the University of Illinois College of Medicine in Chicago on the afternoons of December 8, 9, and 10.

Glycerite of Hydrogen Peroxide, II. Comparison of its Bacteriotoxic Action with that of Solutions Containing Iodine

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An everpresent problem in surgical procedures is the control of present, or the prevention of future infection following traumatic or postoperative tissue damage. Debridement or soap and water washing may not always be immediately practical, and the question arises as to whether to use bacteriotoxic solutions for topical application. Of the many preparations available, those most often applied include the mercurials, the cationic agents and the iodides.

The mercurial solutions are high in bacteriostatic activity, but neutralized by tissue fluids [11] and often the cause of allergic sensitivity. A comparison of the bacteriotoxic action of the mercurial solutions and glycerite of hydrogen peroxide has been reported.[8] The cationic agents are currently popular, but clinical tests have proven them to be relatively ineffective in lesions presenting gross infection.

The iodides are generally considered active and reliable bacteriotoxic solutions. For the rapid but temporary degerming of the surface of intact skin they probably have no equal, although iodine sensitivity does occur. They should not be applied to denuded areas upon which they can only be tolerated infrequently. Our search for a bactericidal agent which could be used for prolonged periods of time on infected damaged tissue led us to work with glycerite of hydrogen peroxide.

The previous studies with peroxides by Meleney [10] and by Reid and Altemeier [12] are too well known to require repetition. The glycerite of hydrogen peroxide differs from the zinc peroxides and others previously studied in that it consists of hydrogen peroxide (1.5 per cent) as derived from urea peroxide (4 per cent), stabilized in anhydrous glycerol.[3] Similar solutions (1.5 and 2.5 per cent) can be made with concentrated hydrogen peroxide (92 per cent) dissolved in glycerol, with 8-hydroxyquinoline (0.1 per cent) added as a secondary stabilizing agent. The solution has been studied regarding its stability [3] and its efficacy in infections of the ear,[5,9] mouth,[4,14] and skin.[15] Tissue tolerance studies [2] have shown it to be relatively free of allergenic, sensitizing, irritating or toxic qualities.

Of the individual ingredients, the glycerol vehicle is anhydrous, and of course, non-allergenic. It is hygroscopic: a great advantage in washing particulate and organic matter to the surface of infected tissues. Used for prolonged periods of time, it does, however, dehydrate the tissues. Its viscosity prolongs the action of the hydrogen peroxide, enhancing its bacteriotoxic properties. The contained peroxide is not only bactericidal for the common pathogenic Gram-positive and Gram-negative organisms,[7,8] but by its decomposition, churns the solution, renewing the surface between the tissues and the fresh active bacteriotoxic substances still present. When the peroxide of the original solution is completely decomposed, the residual solution still contains urea and 8-hydroxyquinoline, which are antibacterial in their own right, the former acting to peptize necrotic tissue, facilitating wound healing.

In the present paper, the glycerite of hydrogen peroxide is compared with a number of iodine preparations. The hydrogen peroxide solutions, which were also compared with each other, consisted of the following:

1. Hydrogen peroxide (1.46 per cent) derived from urea peroxide (4 per cent) in glycerol with 8-hydroxyquinoline (0.1 per cent).
2. Hydrogen peroxide (1.46 per cent) derived from hydrogen peroxide (92 per cent) in glycerol.
3. Hydrogen peroxide (1.46 per cent) derived from hydrogen peroxide (92 per cent) with 8-hydroxyquinoline (0.1 per cent) in glycerol.
4. 8-hydroxyquinoline (0.1 per cent) in glycerol.

The iodine solutions, which were also compared with each other, consisted of the following:

1. Mild tincture of iodine (2 per cent) W/V.
2. Glycerite of iodine NF diluted with U.S.P. glycerol to a content of 2 per cent iodine W/V.
3. Biodone, labelled to contain 2.4 per cent iodine in aqueous ammonium iodide (2.4 per cent), titrated 0.92 per cent from a freshly opened bottle.
4. Iodine solution U.S.P. XII, iodine nominally, 2 per cent as purchased, titrated 1.1 per cent W/V.

The following control solutions were used: Glycerol, glycerol saturated with urea, 8-hydroxyquinoline (0.1 per cent) in glycerol, and a "tincture solvent" consisting of 50 per cent alcohol, 10 per cent acetone, and 40 per cent water, which also served as a control for other antiseptic solutions tested at the same time. Under the conditions of the test, the control solutions, with the exception of 8-hydroxyquinoline in glycerol, showed negligible effects as indicated by a failure to present a zone. The results of the 8-hydroxyquinoline solutions are shown in the accompanying tables.

The bacterial species used for testing purposes and reported upon in this paper include: *Staphylococcus aureus* (FDA 209); *Staphylococcus albus*, coagulase positive; *Staphylococcus pharyngis; Streptococcus liquefaciens*, alpha hemolytic; a beta hemolytic Streptococcus; a diphtheroid; *Bacillus subtilis; Escherichia coli, var communior; Proteus mirabilis; Pseudomonas aeruginosa;*

TABLE 1.

Comparison of Action of Glycerite of Hydrogen Peroxide and Iodine Antiseptic Solutions on Gram-Positive Organisms

Glycerol Solutions	*Staphylococcus aureus*				*Staphylococcus albus*				*Staphylococcus pharyngis*				*Streptococcus liquefaciens*				*Diph-theroid*				*Streptococcus beta hemolytic*			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
hydrogen peroxide (1.5%)	13	10	6	8	18	18	11	12	10	4	7	7	12	13	6	5	12	13	9	6	16	25	14	22
hydrogen peroxide (1.5%) + urea	14	15	13	10	18	18	11	12	12	12	9	9	10	8	8	8	15	13	7	5	14	27	12	18
hydrogen peroxide (1.5%) + 8-hydroxyquinoline	13	15	7	9	22	23	20	17	12	15	7	12	11	14	9	10	9	12	5	5	16	32	15	28
hydrogen peroxide (1.5%) + urea + 8-hydroxyquinoline	13	13	13	11	18	18	14	17	13	10	9	12	11	15	8	12	16	12	14	11	15	30	14	23
8-hydroxyquinoline (0.1%)	10	6	7	7	15	14	10	11	5	4	2	3	6	3	1	2	16	8	6	5	5	6	2	3
Iodine Solutions																								
mild tincture of iodine (2%)	23	13	15	9	26	13	17	11	21	9	10	8	19	10	0	6	19	15	10	10	*	18	*	13
glycerite of iodine (2%)	16	9	7	7	17	10	14	9	11	9	0	7	10	9	0	6	7	11	5	6	*	14	*	10
iodine solution U.S.P. XII	10	10	10	9	15	12	12	10	7	9	6	12	8	8	6	9	18	14	8	9	*	9	*	7
Biodone (aqueous)	14	10	12	10	30	13	17	9	15	9	10	8	17	9	11	9	22	14	8	9	*	12	*	10

Zones were measured radially in mm. from the edge of the cup, preferably to the edge of the clear zone.

*Zones were indistinct due to smallness of the colonies and lack of definition of the edges.

A.—Apparent visible zone of inhibition—no serum.

B.—Zone as determined by subculture—no serum.

C.—Apparent visible zone of inhibition—10% serum.

D.—Zone as determined by subculture—10% serum.

Aerobacter cloacae. The organisms were, with the exception of the *Staphylococcus aureus* (FDA 209), which came from the Food and Drug Administration Laboratory, strains freshly isolated from lesions of clinical interest. Other strains of organisms and of Streptococcus and Staphylococcus in particular were examined. Only one of each is included since the others gave essentially similar results although the clinical strains of *Staphylococcus aureus* tended to be slightly more resistant to some antiseptic solutions than was the FDA strain.

The method used is that described in a previous paper by Brown, Krabek, and Skiffington [8] and is a modification of the Oxford cup method of Abraham, Chain and co-workers [1] and of the U. S. Food and Drug Administration cup plate method.[13]

The modified method consists essentially of the introduction of 0.2 ml. of the solution to be tested into glass or porcelain cylinders with paraffined rims placed on agar preinoculated with the test organism. It is necessary to apply paraffin to cylinders to prevent creeping over the edge of certain solutions, especially the tinctures. Dextrose agar was used in order to obtain growth with the greatest number of strains since some pathogenic organisms fail to grow freely or even at all on the FDA medium. The melted agar was inoculated with 0.2 ml. of an undiluted 22-26 hour dextrose broth culture for each 25 ml. of medium placed in the 100 mm. Petri dish fitted with a porous top. Ten per cent normal horse serum was added to the dextrose agar in an equal number of plates to provide organic matter as well as to simulate more closely a serous lesion.

After incubation at 37° C. for about 18 hours, subcultures of approximately 3 mm. cross section were taken at intervals of 1-3 mm. radially from the edge of the cylinder and placed in modified Brewer's thioglycollate medium (Baltimore Biological Laboratory list 139). The subculture tubes were incubated at 37° C. until growth occurred or for at least seven days. Before discarding the subcultures, those tubes showing no growth were reinoculated with a small inoculum (50 organisms or fewer) of the same strain tested, and incubated for three days, or less time if growth occurred sooner. This technic indicated that the test solutions were not carried over into the subculture tubes in amounts that were inhibitive to the growth of normal organisms.

After subculturing, the distance from the outer edge of the cylinder to the outer edge of the clear zone, if any, was measured to the nearest 0.5 mm. and recorded for each test. At the same time, the distance from the edge of the cylinder to the inner and outer edge of the indentation left by removal of material for subculture was measured and recorded. Because of space limitations, the tables show only the average distal measurements of the subcultures closest to the cup which showed growth in a subculture tube. This procedure, of course, favors the antiseptic. At least three, and in many cases more, replicate tests were made on each antiseptic solution. The values in the table have been rounded off to the nearest whole number since this is sufficient for comparative purposes. Table 1 lists the zones obtained with the Gram-positive organisms and Table 2 those with the Gram-negative organisms. The first col-

Table 2.

Comparison of Action of Glycerite of Hydrogen Peroxide and Iodine Antiseptic Solutions on Gram-Negative Organisms

Glycerol Solutions	**Bacillus subtilis*				*Escherichia coli*				*Proteus mirabilis*				*Pseudomonas aeruginosa*				*Aerobacter cloacae*			
	†A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
hydrogen peroxide (1.5%)	14	13	9	4	3	3	7	6	5	3	5	6	1	2	1	3	6	6	6	6
hydrogen peroxide (1.5%) + urea	13	13	7	7	5	5	7	5	7	6	7	6	4	3	4	5	6	6	6	9
hydrogen peroxide (1.5%) + 8-hydroxyquinoline	13	13	11	14	4	5	3	3	7	6	6	3	5	3	4	3	6	6	7	7
hydrogen peroxide (1.5%) + urea + 8-hydroxyquinoline	13	13	11	11	7	6	6	7	10	9	7	7	5	3	4	4	8	10	8	8
8-hydroxyquinoline (0.1%)	15	16	13	10	4	3	0	0	7	3	2	3	0	3	0	3	6	5	0	3
Iodine Solutions																				
mild tincture of iodine (2%)	11	9	8	8	16	11	11	10	16	12	14	9	6	7	4	5	14	11	12	10
glycerite of iodine (2%)	10	8	7	8	5	10	5	8	5	11	5	8	5	4	0	0	12	7	10	5
iodine solution U.S.P. XII	15	13	7	9	13	13	1	9	8	9	8	9	6	6	3	3	10	11	7	7
Biodone (aqueous)	10	9	7	7	10	8	7	7	9	8	9	10	3	4	3	4	8	8	6	7

*A Gram-positive organism.
†See footnotes to Table 1 for meaning of column headings.

umn (A) indicates the apparent visible zone, the second column (B) the zone obtained by subculturing, for plates without serum. The corresponding values for plates containing 10 per cent normal horse serum are given in columns (C) and (D). The comparisons in the table are self-evident and require little comment. However, some general inferences may be drawn from the data presented.

The peroxide solutions all showed definite bactericidal action on both Gram-positive and Gram-negative organisms. In general, for the strains of Gram-positive organisms tested, the peroxide-glycerol solutions containing 8-hydroxyquinoline gave zones, as indicated by subculture, equal to, or larger than, those of the iodine solutions. A very marked superiority of the peroxide solution over the iodine solutions was noted in the case of the beta hemolytic strain of Streptococcus.

The peroxide solution containing urea and 8-hydroxyquinoline was more effective against the diphtheroid organism than were peroxide solutions without urea. Compared with iodine solutions, the glycerite of hydrogen peroxide solutions were somewhat less effective than the iodine solutions on the same organism.

For the most part, solutions made with hydrogen peroxide derived from urea peroxide and directly with hydrogen peroxide showed little difference in activity when compared on the basis of equal content of hydrogen peroxide. The significance of the difference observed is questionable. In clinical practice, the physiological effect of urea in promotion of wound healing appears to play an important part and would not, of course, show in *in vitro* tests.

Glycerite of hydrogen peroxide solutions demonstrated the least effect on the *Pseudomonas aeruginosa* strain although a severely infected lesion of the abdominal wall, of considerable area, from which the strain was obtained, appeared to be favorably influenced and eventually cleared up by continuous application of the glycerite of hydrogen peroxide solution previously described.

Summary

Glycerites of hydrogen peroxide, with and without 8-hydroxyquinoline, compare favorably with mild tincture of iodine, glycerite of iodine (2 per cent) and with two aqueous iodine solutions in their action on Gram-positive organisms when tested by a cylinder plate method. A marked superiority of the peroxide solution was noted in the case of a strain of beta hemolytic Streptococcus.

The solutions containing free iodine have, in general, a greater effect on Gram-negative organisms than do the glycerite of hydrogen peroxide solutions.

There is little, if any, significant overall difference in the results reported between solutions containing hydrogen peroxide as derived from urea peroxide and from hydrogen peroxide alone in glycerol; or between solutions with or without 8-hydroxyquinoline. What little difference is present appears in favor of the solution containing 8-hydroxyquinoline. In specific instances, as with some Staphylococci in the presence of serum, the addition of 8-hydroxyquinoline appears to affect favorably the activity of the glycerite of hydrogen peroxide solution.

The apparently favorable clinical action of urea present in the solution made with urea peroxide does not appear in the plate tests. In a similar way, clinical studies do not permit comparison with iodine since continuous application of iodine solutions is not permissible.

The clinical results achieved with the solution, used as a postoperative dressing, will be described in a separate paper now in preparation.

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Book Reviews

Principles and Practice of Obstetrics, by JOSEPH B. DELEE, M.D., Late Professor of Obstetrics and Gynecology, the University of Chicago; Consultant in Obstetrics, the Chicago Lying-in Hospital and Dispensary; and J. P. GREENHILL, M.D., Attending Obstetrician and Gynecologist, the Michael Reese Hospital; Obstetrician and Gynecologist, Associate Staff, the Chicago Lying-in Hospital; Chairman Dept. of Gynecology, Cook County Hospital; Professor of Gynecology, Cook County Graduate School of Medicine. 9th edition, 1011 pages, 1108 illustrations on 860 figures, 211 in color. Philadelphia and London: W. B. Saunders Company, 1947; $10.00.

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This popular textbook on obstetrics has been practically rewritten by Dr. J. P. Greenhill since the time he was designated by Dr. Joseph B. DeLee to continue as co-author of this work. The ninth edition presents a continuation of the changes started by Greenhill in 1943. Several new chapters have been added, a few have been omitted or combined with others, the remaining chapters have been rewritten and new material added. Many new illustrations are presented including four which depict dissections of the pelvis prepared by Anson and Curtis.

The new chapters deal with minor disturbances of pregnancy, premature labor, prolonged pregnancy, missed labor, fetal erythroblastosis, care of premature babies, and circumcision. To the chapter on analgesia and anesthesia the author has added detailed descriptions and illustrations of direct, local and infiltration anesthesia, and caudal analgesia. The latter is recommended for use only in hospitals that have available an adequate number of personnel who are well trained and experienced in its administration. Many advantages are listed for the use of direct infiltration anesthesia. This method can be performed in either home or hospital by operators without special training and without significant danger to either mother or baby. The properties of the general anesthetic agents used in obstetrics are summarized in a table added to this chapter.

Changes have also been made in the chapters on hyperemesis gravidarum, toxemias of pregnancy, postpartum hemorrhage, placenta praevia, abruptio placenta, placenta accreta, and the acute and chronic infectious diseases complicating pregnancy. The use of chemotherapeutic and antibiotic agents in obstetrical infections and the importance of German measles in obstetrics are discussed.

This edition has been completely reset. The printed page is divided into double columns, a change which, together with the elimination of much of the fine print in the text and bibliography, makes the physical process of reading less of a strain than it was in the earlier editions. Despite the addition of new material the number of pages has been reduced—90 pages since the last edition and by 200 pages since the 7th edition. This represents deletion of material that was outdated or only of historical interest and is in line with the author's stated aim to "have the continuity of the book so placed as to make its contents both scientific and practical."

The many changes effected are largely in organization, method of expression, and addition of recently available information. The general principles of obstetrical teaching still conform to those set forth by Dr. DeLee during his many years as professor of obstetrics at the Chicago Lying-in Hospital. The revised text should meet with the general approval of both students and practitioners. M. S.

A History of the American Medical Association, by MORRIS FISHBEIN, M.D., with the Lives of the Presidents of the American Medical Association, by WALTER L. BIERRING, M.D.; and with histories of the Publications, The Councils, The Bureaus and Other Official Bodies. 200 illustrations, pp. 1226. Philadelphia: W. B. Saunders Company, 1947.

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Here at last is a complete and definitive history of the first one hundred years of the American Medical Association. This monumental work by the editor of the A.M.A. *Journal* records the founding of the association in Philadelphia in 1847, its struggle and growth and its brilliant accomplishments.

Much of the material presented has never before appeared in print. Especially to be commended is the history of the last twenty years, the vital and significant era from 1924 to 1947.

The source material for this inspiring story of the association was obtained from the Official Transactions of the Association; official proceedings of the House of Delegates; Minutes of Meetings of the Board of Trustees; official correspondence of the association; and the biographies of many leaders of American medicine which Dr. Fishbein has collected.

Countless hours of reading pleasure are assured by the numerous features of the history. In addition the reader will find practical reference material on the Councils, Bureaus, and Publications of the association. The biographical section includes the life story of Dr. Nathan Smith Davis, founder of the association, and biographical sketches of the presidents of the association. M. P.

Health Service in the College Program

Ralph I. Canuteson, M.D.
Lawrence, Kansas

During the war years since our last meeting in 1941, health services have not been static. Some have shrunk or completely subsided; others have mushroomed into new and expansive responsibilities, governed only by the resources of the colleges and the needs of a fluctuating and decidedly different campus population. Most of the dormant health services now show signs of rejuvenation. Many of the war-time changes in practices have become permanent fixtures. Encouraging numbers of schools are starting new or completely reorganized health programs. These generally are being built along pre-war patterns but with the elimination of obsolescent ideas and with the addition of new services. Shifting personnel is bringing into the field younger men and women. They may not possess the advantages of long experience in health services, but they have enthusiasm, undulled by years of pushing against an inertia of disinterest in public health.

The pattern of a health program is governed by its origin, and so we find varieties of emphasis on the basic parts of the program. Some schools stress medical services, others physical education or health education. Decentralization of effort is the practice, rather than integration. This Third National Conference, in which our Association is taking an active part, provides for a survey of the entire college health program, and an opportunity to bring together the components.

Attempts have been made frequently to evaluate college health programs and to measure in terms of improved health practices or better health the effect of exposing college students to the various phases of the health program. No satisfactory standards have resulted. The imprint upon the individual is hard to measure but little does a student benefit if he knows all the answers on a final examination in a health instruction course and fails to be able to apply this knowledge to his daily living. Filing cases are filled with physical examination records of students who may have remediable physical defects, but the examination is wasted time and effort if nothing is done to change the defects. Translation of health education into health practices is the objective.

Perhaps the war has served two useful purposes. The findings of Selective Service medical examinations again startled a complacent public, just as they did twenty-five years ago. This data, together with a demonstrated need for prevention of disability, stimulated further more general interest in public health. Let us hope that these interests do not expire as comfortably as they did after the first war.

In measuring the importance of a college health program, we must meet the criticism that only a relatively small proportion of young people enjoy advantages of formal education beyond the high school level. But this college group, doubled in size in the past ten years, encompasses most of the future teachers and large numbers of potential community leaders. Add this present group of more than two million college students to the increasing number in other social groups who are receiving benefits in one form or another of health education, and the importance of each bit of the health program becomes more apparent.

There are three major leads that must be followed if we maintain progress in college health programs. I want to mention them very briefly.

First we must repeat and re-emphasize that education is not complete without some understanding of what constitutes good health and how it may be gained and retained. This education should start with the educators who must first become believers before they can pass the idea on to their students. Too often on college campuses there is a feeling that a formal course in personal health is the complete answer to the need for health education. Or that the responsibility of a college for healthful environment extends no further than reasonably well lighted, heated and ventilated classrooms. Frequently the music of the cash register at the stadium overshadows the less vigorous demands for adequate intramural playing fields and recreational facilities. And often the health service is regarded only as a first-aid station for quick repairs rather than as an application of public health practice and health education.

This leads to the next point.

Every college, regardless of its size, has the makings of at least a minimal health program. If there is no departmental head for such a program, a start may be made with a health committee composed of representatives from departments that can make contributions or that are especially interested in health of students. Included, for example, may be representatives from the departments of physical education, biology and home economics, and the advisors of men and of women. From this basic structure it is not a far step to the acquisition of a trained public health nurse, and then medical advisors on either a part or full-time basis. Help can be obtained from various established agencies such as the State Board of Health, local Health Units, the Tuberculosis Association and medical groups for arranging tuberculosis case-finding programs, for routine physical examinations and for help in education in public health areas.

In colleges where the health program is in action, it is well to survey the campus with a view towards closer speaking acquaintance among the various departments concerned with the physical and mental health of students. Too often unnecessary barriers exist between

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Presented as President's address at the 25th annual meeting of the American Student Health Association, May 8, 1947, New York City.

these departments, especially in the larger colleges where the magnitude of enrollment interferes with closer correlation of departmental efforts.

The newer additions to the campus, the guidance clinics, speech correction departments, and the numerous advisory agencies all have contributions toward a complete health program, and in turn they can function more wisely when they draw information gathered by related groups.

The third point I want to mention is that in existing health programs there may be opportunities for housecleaning and renovation. We need to step back and survey our own departments. What are our objectives? Are we directing efforts toward achieving them? Are we limited in achievement of our objectives by our own inertia or by outside restrictions.

It has been stated recently that in some areas of the health program we are spoon-feeding college students. I think this is rank exaggeration. For many years we have been dropper-feeding them with homeopathic doses of health education and public health. We need to expand our health programs and tie them more closely into the student's activities and needs. For example, a health education course that offers complete information about reproduction of the onion tip is not too practical when student demand is for rational knowledge about basic physiology of the human body. Physical education is optional in many colleges, or restricted by staff limitations to the level of activity of the husky brutes who will exercise regardless of college requirements. Instead of concentrating on physical exercise as a pleasure and benefit for the individual, too much emphasis is directed toward developing material for intercollegiate competition. Just because Abraham Lincoln achieved fame from a lowly start in a dirt-floored log cabin heated and lighted by an open fire, we should not overlook the importance from a health and from an educational standpoint, of adequate student housing.

In some schools it is quite ethical for a health service to do routine physical examinations on students and uncover remediable physical defects, but it is not considered quite acceptable to do more about them than to send the information on to the parents. If the student has a family physician who is interested in preventive medicine and the means to finance this optional treatment he will be cared for, otherwise nothing is done and the results of the examination become only data.

These are a few of the points we should investigate. We have had sufficient experience now so that we should be able to identify the important elements in a rational health program. This may necessitate the elimination of some of the practices we now follow in favor of better ones. Unless there are other agencies available that can provide the same, or better health protection within the reach of all college students, it is very difficult for me to understand how anything directly affecting the health of a college student is not the business of the college. Nor is it easy to understand how a college has fulfilled its educational obligations to the students if health education is not an integral part of the college curriculum and campus life.

With the prospect of another million increase in college enrollments, all colleges will be taxed far beyond effective capacities. Health Services will have to absorb their share of this increased load. The immediate outlook for adequately trained personnel is not bright, but the emphasis on the importance to general college education of a well-rounded health program cannot be minimized.

SICKNESS STATEMENTS FOR RAIL WORKERS

Physicians throughout the Nation are being asked to furnish medical evidence to substantiate the claims of railroad workers who may now draw cash sickness benefits under the Railroad Unemployment Insurance Act. The Railroad Retirement Board pointed out that unless an application is mailed not later than the seventh day after the first day of sickness claimed, it may not be received within the legal time limit for filing applications. As a result, the employee may lose one or more days' benefits. Doctors are asked either to return each completed Statement of Sickness to the patient, or mail it promptly to the office of the Board to which it is addressed.

UROLOGY AWARD. The American Urological Association offers an annual award of $1,000 (first prize of $500, second prize $300, and third prize $200) for essays on the result of some clinical or laboratory research in Urology. Competition shall be limited to urologists who have been in such specific practice for not more than five years and to residents in urology in recognized hospitals. The first prize essay will appear on the program of the forthcoming meeting of the American Urological Association, to be held at the Hotel Statler, Boston, Massachusetts, May 17-20, 1948. For full particulars write the Secretary, Dr. Thomas D. Moore, 899 Madison Avenue, Memphis, Tennessee. Essays must be in his hands before March 1, 1948.

The General Practitioner in His Community

W. A. Wright, M.D.
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I would like to present a few observations on the subject of medical care in general and the place therein of the general practitioner in a rural state such as we live in.

At the outset I would like to make it quite clear that I firmly believe in the private practice of medicine as the best way of caring for people's medical needs; that improvement in medical care can and will come within the framework of our present system; that the doctor's responsibility to the community and individual can be best met under this system and that the responsibility of the individual and the community to the doctor is equally important and can also be met under this system.

It seems to me somewhat unfortunate that the public conception of a general practitioner has been of an eccentric, unbusinesslike, lovable old character longer on human sympathy and understanding than on knowledge of scientific medicine. Usually he has been depicted somewhat after the manner of Sir Luke Fildes' famous painting, "The Doctor," where the doctor is sitting at the bedside of a dying child. This is the most charitable picture of a general practitioner. By others he is regarded as somewhat of an anachronism, a hold-over from the past, something to be tolerated only until there are sufficient specialists available to take over from his faltering hands the torch of medical progress.

I think it is true that the family doctor of the past is rapidly disappearing. It is also true that his place is being taken by much better trained, active, men and women, with the facilities, training and ability to render a high type of medical care. There is available to them a wealth of medical knowledge and what is more important, they are sufficiently well educated to apply this newer knowledge in their daily work. Many diagnostic and treatment techniques formerly only mastered by a few specialists are now thoroughly familiar to, and being used by, alert general practitioners because their education is such that they are able to learn and carry out such procedures. It has been stated by others, and I believe it is true, that the average general practitioner is quite capable of caring for 80 to 85 per cent of all illnesses. We rather like the conception that a general practitioner is a specialist in the care of the individual as a whole.

There will always be an important place for the individual specialist and the specialist group. There is, however, some difference of opinion as to whether specialist care should be more especially directed to the unusual and difficult cases or whether all care could best be given by groups of specialists. I do not propose to develop the arguments pro and con in this matter but will reiterate my belief that the general practitioner with a good training is able to care for ordinary illness very satisfactorily and much more economically than a specialist or specialist groups.

The rise of specialism and attendant multiplicity of auxiliary agents has been a most important factor in developing the truly remarkable progress in diagnosis and treatment during the past few decades. Associated with this there have developed certain trends in medical education and practice which I should like to draw to your attention.

A. *Medical Education*

1. The time spent in medical school has been greatly increased as has the average period spent in hospitals as an intern or a resident.
2. Practically all teaching is done by specialists, many of whom are full-time teachers and not actively engaged in practice. There is a regrettable tendency on the part of some teachers to utilize contempt for general practitioners as a substitute for humor.
3. Early clinical training is received in large hospital out-patient departments where practically all care is given by specialists.
4. The increasing custom of students entering training in a specialty immediately following graduation. In former years, most specialists served a period of years as a general practitioner and later took special training in their chosen field. This is no longer customary.
5. The practice of certification by specialty boards. For each major specialty there have been organized examining boards which set up standards of training and conduct examinations.
6. In the armed forces and the Veterans Administration, medical personnel is graded as to their specialist ability, board certified specialists receiving top rating. Wherever possible, all care is given by specialists.
7. Such educational and administrative attitudes tend to glorify the specialist in both lay and medical minds and makes general practice appear to be a less attractive and less honorable form of medical service.

It is small wonder then that the student, recent graduate and ex-army and navy officer believes that only by becoming a specialist will he achieve a desirable position in the profession. A few medical schools are beginning to face this problem and in several of them, courses and hospital internships are being rearranged so that the student may be graduated as a well-rounded, general practitioner rather than an embryo specialist.

B. *Medical Practice*

Paralleling the trends in medical education, influenced by them and by the changing pattern of urban and rural life associated with mechanical invention and improved transportation there have been extensive changes in methods of medical practice. In the not too distant past, medical care was given in a home, and knowledge of disease being what it was, the doctor could provide care with what knowledge he carried in his head and the material things in his black bag. The tremendous increase in the use of adjuncts such as hospitals, laboratories and the improved but more intricate techniques used have rendered this type of care obsolete except for the most simple types of illness. Accordingly, there has been a tremendous increase in the number of clinics, hospitals, laboratories and various types of medical groups. Whereas in previous days the doctor almost always went to the patient, now usually the patient goes to the doctor and is seen either in his office or the hospital. The result is that the individual receives better care and the doctor can make the best possible use of his time.

During this same period and largely because of the perfection of the automobile and kindred mechanical devices there have been changes in rural life. In general, this has resulted in a reduction in the number of people who actually live on farms and in a tendency to the development of natural trading centers where farmers and people of towns and villages tend to do their marketing, banking, and other business. It naturally followed that they tended to look for medical care in such centers and as a result of all these factors, doctors, along with bankers, lawyers, and others, left the small towns and villages and tended to concentrate in the natural trading centers. This, I believe, has resulted in vastly improved general medical care because among other reasons, doctors, whether associated together in a clinic or associated together by the fact of working in the same hospital, have the advantages of consultation with, and help from, their confreres. I would like to emphasize that membership on a common hospital staff calls for a good deal of cooperation, mutual assistance and constructive criticism, all to the benefit of patient and practitioner. Concentration of medical personnel in the recognized trading centers has made it possible for one doctor to care for a great many more people, none of his time being used in travel. People can be better cared for because facilities for care are usually available.

Because we now have a practical and efficient means of delivering medical care does not mean that there is not great room for improvement. Doctors are open to criticism, with more or less justification, on three counts:

1. Quality of service
2. Availability
3. Cost.

1. *Quality of service.* Confining ourselves to general practitioners, he may be at fault in four ways:

1. Failure to differentiate between the trivial and the serious, a somewhat natural tendency as he sees so much triviality.

2. Failure to observe the limitations imposed by his training and experience. Specifically this brings up the question of a rural or any other practitioner attempting surgical procedures or medical treatments without sufficient experience, or as is often the case, in some localities without sufficient assistance either by other physicians, nurses, or laboratory technicians. Under our present licensure system, the doctor himself must be the judge of his own limitations which obviously must vary with the individual. Actually, there are throughout the United States a great many general practitioners who have achieved the skill of a specialist in certain fields and are thoroughly capable of giving good surgical, medical, obstetrical, pediatric and other services as well as to carry on the duties of a family doctor.

3. Neglect of study and education.

4. The all-too-human failings of carelessness and laziness. It is to be noted that these are largely criticisms of the individual rather than of the system, and improvement therefore can only come through better education of a more and more high-minded type of person.

2. *Availability.* Under present economic conditions, good average medical care is available to all the people of North Dakota within the limitations imposed by the number of doctors, hospitals and related institutions and their distribution. Of course, there are not enough of either to meet the present demand, nor is the distribution such as to make it possible for all people to receive medical care without traveling rather long distances. This is indeed a hardship, but closer examination of this picture shows us that the hardship is not as great as one might think. Our grandfathers living 10 miles from town were farther removed from care in point of time than are people now living 50 to 75 miles away. It takes less time to drive 50 miles in North Dakota than it does to drive through one of our large cities.

We rarely see patients with advanced neglected disease. In fact, we get our cases of appendicitis, perforated ulcers, hemorrhages, fractures and other acute emergencies at a much earlier stage than 15 or 20 years ago, earlier than in many cities. In a large army camp with free medical care practically on their door-step, the average time lapse between the onset of acute appendicitis and operation was three days, whereas it is unusual for us to get a case much over 24 hours. If people know that by going to a recognized center they will be assured of care, modern transportation makes it possible for them to get there, and having arrived at such a center, they are entitled to, and should receive, prompt and efficient care. Obviously, then, medical and nursing staff must be available at all times so that it is difficult, if not impossible, for a doctor to be available for service at the center and also make calls in the country. Furthermore, as no one can work all the time, it means that each such center needs to be manned by more than one doctor.

The availability, distribution, and number of physicians and nurses can be improved within the framework of the present system and without recourse to drastic changes in our economy. This can be done through a change in educational methods whereby more rural inhabitants are educated for these professions and return to their rural or semi-rural environments. Not only are city-raised physicians unhappy if they locate in the country but their patients often do not like them. However, even rural boys and girls are not likely to settle where there are no hospital facilities, or hospitals with insufficient professional assistance. An institution without adequate medical personnel is not a hospital but a somewhat dangerous hotel.

3. *Cost.* Medicine is an expensive commodity and all the present-day trends previously enumerated have inevitably tended to increase the cost. On the other hand, progress has resulted in a sharp reduction in the length of time needed to recover from many diseases treated either medically or surgically and this fact has been of considerable help in keeping down the overall cost, or at least in keeping it from rising higher than it has. Many solutions have been proposed and I am familiar with most of them. The facts of the matter are that good medical care is going to cost somebody money, whether it be paid by the individual, a group, or a government agency.

As doctors, we see these problems in a way no one else can possibly see them. They pertain to our daily work and naturally we are closer to them than anyone else. It must be borne in mind that no matter what system is eventually evolved in this country for delivering medical care, the doctor is the one who is going to deliver it, whether they are the same doctors here today or new ones trained in the future. They must be the ones who will care for and try to help sick people. Hence, any changes to be successful must be those which will enlist the active cooperation and enthusiasm of the medical profession.

. . . MEET OUR CONTRIBUTORS . . .

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Hyperparathyroidism

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HYPERPARATHYROIDISM is a disease with either neoplastic or hyperplastic changes in the parathyroid glands which result in increased function with attendant symptoms related to the skeletal system, the genito-urinary tract, and to chemical alterations in the blood.

This disease has been thought by many to be a rare condition. However, this actually is not the case. Cope [1] states that parathyroid disease frequently exists; it is merely not diagnosed and not proved.

The first description of the parathyroid glands as anatomic structures is credited to Sandstrom [2] in 1880. Von Recklinghausen [3] in 1891 described osteitis fibrosa cystica, which condition bears his name, and which later was to be demonstrated as one of the manifestations of hyperparathyroidism. Askanazy [4] in 1904 in post mortem examinations demonstrated parathyroid adenomas in cases of bone disease with tumors, cysts and generalized decalcification. And later, in 1907, Erdheim [5] noted enlargement of the parathyroid glands in association with von Recklinghausen's disease. However, the parathyroid enlargement was wrongly interpreted as being secondary to the bone disease.

In 1925, a Viennese surgeon, Mandl,[6] first showed the true relationship of osteitis fibrosa cystica and tumor of the parathyroid glands. He successfully excised a parathyroid adenoma with resultant recalcification of the bones. From that time on, the concept of hyperfunction of the parathyroid glands as the etiologic endocrine basis for osteitis fibrosa cystica was correctly maintained.

DuBois [7] and his associates, a year later showed the similarity between the clinical and chemical abnormalities observed in a case of von Recklinghausen's disease and those which followed the administration of an excess of parathyroid hormone to experimental animals.

In this country, in 1929, Barr [8] and his colleagues were the first to report the successful removal of a parathyroid adenoma in a case of osteitis fibrosa cystica. Thereafter, similar case reports appeared in the literature with increasing frequency.

The clinical and physiologic aspects of hyperparathyroidism have been largely pioneered by the group of workers at Massachusetts General Hospital. The first of a series of studies appeared in 1930 by Bauer, Albright and Aub,[9] and subsequent articles by these men and others from the same hospital have further developed and clarified the subject.

Churchill and Cope [10] of the surgical service of the Massachusetts General Hospital have developed the operative procedure to a high degree through their experience with the large group of cases diagnosed at that hospital, and their technique will be further discussed subsequently.

CLINICAL INCIDENCE

The incidence of parathyroid disease seems to depend in large part on the efforts made towards its diagnosis, and the realization that the disease is not always manifest by bone changes, but rather that the precipitation of calcium in the urinary tract is actually the commonest complication of hyperparathyroidism. From 1932 to 1944 there were 78 proved cases of primary hyperparathyroidism at the Massachusetts General Hospital.[1] The following table shows the incidence of the clinical types in that series.

Table: Clinical Types of Hyperparathyroidism of Massachusetts General Hospital Series of Cases

Complication	Number	Per Cent
Bone Disease:		
Classic	23	30
Decalcification	1	1
Decalcification and renal stones	11	14
No Bone Disease:		
Renal stones	43	55
Total cases	78	

Keating [11] has written of the experience regarding the incidence of hyperparathyroidism as seen at the Mayo Clinic. The first case was reported in 1929 by Wilder.[12] Subsequently, the diagnosis was made very infrequently and only 14 cases of proved hyperparathyroidism were observed in 14 years; that is, from January 1929 to September 1942. In view of the much higher incidence found at the Massachusetts General Hospital, it was felt that cases were being overlooked at the Clinic, as well as elsewhere, and an attempt was made to improve the diagnostic accuracy. Following this cooperative effort of the internists, urologists and surgeons, in a period of two and one-half years from September 1942 to January 1945, hyperparathyroidism was proved by operation in 24 cases. In that series, 29 per cent showed the clinical picture of classic osteitis fibrosa cystica; minimal lesions of the skeleton were present in 38 per cent of the cases; but in 33 per cent there was no evidence whatever of osseous lesions.

PATHOLOGY

The parathyroid hormone controls the distribution of both calcium and inorganic phosphate ions in the blood. In hyperparathyroidism there is an increase of the hormone due to either a functioning adenoma or a generalized hyperplasia of the glands. Increased parathor-

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mone activity results in an increase of the level of the calcium ions in the blood stream and a decrease of the level of the phosphate ions. The excretion of both calcium and phosphate through the kidney is increased. Fecal calcium excretion may be slightly diminished. The disturbed calcium and phosphorus metabolism underlies the other pathologic changes. The morphological changes in the parathyroid glands themselves will be described in the section devoted to surgical considerations. The secondary pathology is as follows:

Bone Pathology:

The bones act as the storehouse for calcium and phosphorus in the body. With increased urinary excretion of calcium and phosphorus, changes in the bones may or may not develop. If the amount of calcium absorbed from the food ingested is equal to that lost in the urine there are no bone changes. This group constituted the majority of the cases (55 per cent) as seen in the large series at the Massachusetts General Hospital.

However, if urinary excretion of those minerals exceeds intake, there is demineralization of the bones to compensate for the excessive loss. This may take one of two forms: (1) diffuse osteoporosis or decalcification as described by Albright and his associates,[13] or (2) the advanced stage of bone disease or osteitis fibrosa cystica (von Recklinghausen's disease) which shows a profound derangement and depletion of the bone. There is extensive resorption and decalcification of bone with much fibrous proliferation. There is marked cellular activity with increase in both osteoblasts and osteoclasts. Multiple cysts with fibrous walls may form as well as tumors composed of osteoclasts which are called giant cell tumors. Jaffe [14] gives a detailed account of this specialized type of bone pathology.

Urinary Tract Pathology:

In hyperparathyroidism the increased urinary output of calcium results in supersaturation of the urine, and the calcium precipitates out as a phosphate salt. If oxalate is present, calcium oxalate may be formed. This precipitation of calcium salts may occur anywhere in the urinary tract. It may take place in the parenchyma along the tubules, and gradual impairment of kidney function occurs. Casts may form in the lumen of the tubules. In other instances, the precipitation may occur in the calyces or kidney pelvis and calculi result. These, of course, may pass into the ureter with the usual symptomatology. Renal insufficiency may result either from diffuse calcification of the renal parenchyma with sclerosis and destruction of renal substance, or from pyelonephritis or hydronephrosis secondary to stones. When renal impairment occurs, there may be failure to excrete phosphate, chloride and nonprotein nitrogen. As a result, the level of these substances increases in the blood. The phosphate may rise from its subnormal to a normal or even elevated level which may tend to depress the elevated calcium level.

Albright and Cope feel that from 10 to 15 per cent of the stone cases they see are due to hyperparathyroidism.

Blood Pathology:

In occasional cases extensive replacement of the bone marrow with fibrous tissue may interfere with hematopoesis with resultant anemia and leukopenia. Albright [15] cites a case in which the red blood cell count was 2,400,000 and the hemoglobin 50 per cent, with a white blood cell count of 3,100.

Dental Pathology:

There is no change in the density of the teeth themselves. However, the fine layer of cortex surrounding the root of each tooth, called the lamina dura, tends to disappear. The jaws may become demineralized, and bone changes occur similar to those found elsewhere in the skeleton.

Clinical Types

Albright [15] classifies the clinical types of the disease according to the system involved and the degree of involvement. It should be remembered that changes in bone and the renal involvement occur together in many cases.

1. *Classic Hyperparathyroidism:*

This is von Recklinghausen's disease in which the skeletal involvement is the predominant feature. There is decalcification of bone. Cysts and giant cell tumors develop. Pathologic fractures eventuate in many cases.

2. *Osteoporotic Form of Hyperparathyroidism:*

In this type there is generalized decalcification of the bone with attendant symptoms, but an absence of cysts and tumors.

3. *Hyperparathyroidism with Nephrolithiasis:*

In these cases the symptoms are due to renal stones. Skeletal changes may or may not be present.

4. *Hyperparathyroidism with Renal Insufficiency:*

This is the so-called nephrocalcinosis.

5. *Acute Parathyroid Poisoning:*

This simulates acute parathyroid poisoning in dogs with sudden death. A case of this type is reported by McClure [16] in his review of end results in treatment of hyperparathyroidism.

Diagnosis

I. Symptoms and Physical Findings

These may be variable depending upon the organ-system involved and the degree of involvement. Generally the symptoms may be divided into three groups, namely: (1) the symptoms produced by the chemical changes which have occurred in the blood, (2) the symptoms produced by the skeletal involvement, and (3) the symptoms related to the increased excretion of calcium and phosphorus in the urine and the accompanying changes in the urinary tract.

1. *Symptoms related to the changed blood chemistry:*

In hyperparathyroidism there are two fundamental blood changes — hypercalcemia and hypophosphatemia. This is the opposite of the findings in parathyroid tetany. Likewise, the general symptoms of hyperparathyroidism are the opposite of those found in tetany. There may be muscular hypotonia, weakness, fatigue, lassitude, constipation, anorexia, weight loss, nausea, and vomiting. These general symptoms, however, are variable and may be vague. In cases of minimal blood changes, they may be absent. Albright [15] points out that their having been present becomes obvious only after they have disappeared following successful treatment. Then the patient comments on his improved condition. In 6 cases reported by Flink,[17] all patients had muscular weakness marked enough to interfere with their work and even to cause semi-invalidism of several patients. He also reports a case with such severe gastro-intestinal symptoms that pyloric obstruction was suspected clinically. X-ray studies after the administration of barium revealed no obstruction but very slow bowel motility.

2. *Symptoms due to skeletal involvement*

As pathologic changes in the bones may be absent or of varying degree, from minimal to very extensive involvement; so, the symptoms referable to bone may vary from none to severe pain associated with deformity and pathologic fractures. Pain in the bones and joints is a common symptom in hyperparathyroidism. In patients with minimal skeletal involvement there may be only a vague aching. In the advanced cases, the tumors and cysts may be found; deformities and pathologic fractures may occur; and there may be intense pain. The most common sites for the bone lesions are the long bones, ribs, pelvis, and metacarpal and metatarsal bones. Involvement of the vertebral bodies may result in kyphosis and loss in height. Albright [15] cites a case in which the patient complained of a loss of 7 inches in height. McClure[16] reports a case with such marked genu valgum that an orthopedic procedure was considered to correct it. However, following removal of the parathyroid adenoma there was enough spontaneous correction so that operation could be avoided. Fractures occurring with little or no trauma should alert one to the possibility of hyperparathyroidism. In one of the cases reported by Flink,[17] a pathologic fracture of the right femur first caused the patient to consult a physician. The so-called epulis of the jaw may be found in some cases.

3. *Symptoms related to the genito-urinary tract, hypercalcinuria, and hyperphosphaturia*

The increased excretion of calcium and phosphorus in the urine results in many cases in polyuria and polydipsia. These symptoms may be marked enough to confuse the diagnosis with diabetes insipidus. If they are kept clearly in mind, they may be of real value in giving a clue to the diagnosis of hyperparathyroidism.

Renal stones form in a high percentage of cases. Cope[1] reported 55 per cent of a series of 78 cases as having renal stones, and Keating [11] found an incidence of 80 per cent in a series of 24 cases. Renal colic thus becomes an important symptom. Hydronephrosis or pyelonephritis may develop with ensuing renal insufficiency. In some instances, nephrocalcinosis occurs with calcium deposits in the kidney parenchyma. There is subsequent sclerosis and destruction of kidney substance leading to renal insufficiency. Acute parathyroid poisoning has been mentioned. There are calcium deposits in the kidneys, and all other organs, with anuria and death.

II. Roentgenologic Diagnosis

In the cases with lesions in the bones, X-ray examination will be of real value in diagnosis. If the skeletal changes are slight, they will first be noted as a mild, diffuse, miliary osteoporosis of the skull. More advanced cases show mild *generalized* demineralization of the bones, especially in the extremities. When there are extensive bony changes, such as cysts and tumors, the entire skeleton is also *diffusely* involved. If there is demonstrable normal bone in such cases, the diagnosis is not hyperparathyroidism. As mentioned above, the bony changes are usually most marked in the skull, long bones, metacarpals, and the ribs. But *generalized* increased radiability is the fundamental change. Extensive and obvious deformities may be demonstrated by X-ray examination. Cysts are usually multiple but not necessarily so. The bone may be markedly expanded at the site of the cyst. The cortical location of a cyst is important diagnostically. The tumors or osteoclastomas, on the other hand, occur where there is cancellous bone, usually in the jaws, ends of the long bones, or in the ribs. Fractures through the cysts or tumors, of course, are demonstrable by X-ray examination. Dental X-ray examination may be helpful by demonstrating the disappearance of the lamina dura about the roots of the teeth which occurs in hyperparathyroidism.

Roentgenograms of the urinary tract may demonstrate calculi or calcification in the renal parenchyma.

In certain cases, X-ray examination may be of help in locating a parathyroid adenoma prior to surgery, especially in cases in which the tumor lies in the anterior mediastinum. In other cases in which the tumor lies near the esophagus, fluoroscopy during a barium meal may demonstrate it.

III. Laboratory Findings

The chemical examination of the blood and urine is essential in substantiating the diagnosis of hyperparathyroidism. The combination of findings is practically unique in this disease. The most important determinations are of the serum calcium and serum phosphorus levels.

1. *Hypercalcemia*

This is an essential finding. The normal value for total calcium in the serum is 10.0 mg. per 100 cc., plus or minus 1.0 mg. Values above 11.0 mg. per 100 cc. are significant. In one series reported by Albright,[15] the range was from 11.5 mg. to 16.8 mg. It should be noted that the value of total serum calcium will depend upon the total protein in the serum since one of the fractions is calcium proteinate, a combination of calcium and serum protein. This fraction varies with the serum protein concentration and this fact must be borne in mind when serum protein levels are low. In such cases, the ionic calcium which is controlled by parathormone may be actually increased when the amount of total calcium is normal. McClean and Hastings [18] have devised a means for determining indirectly the values of the separate fractions of serum calcium.

2. *Hypophosphatemia*

The normal value of serum phosphorus, as given by Keating,[11] is 3.5 mg. per 100 cc., plus or minus 0.5 mg. In cases of hyperparathyroidism this figure is lowered. In a series of cases cited by Albright,[15] the levels varied from 3.6 to 1.5 mg. per 100 cc. Cope [1] points out that when renal impairment is present, there may be alterations in the blood findings. The kidney fails to excrete phosphorus, and the phosphate level of the serum may rise from its abnormally low level to normal or even above, and in turn may tend to depress the serum calcium level.

3. *Hypercalcinuria and Hyperphosphaturia*

An excessive amount of calcium excreted in the urine is significant in confirming the diagnosis of hyperparathyroidism. Hypercalcinuria and hyperphosphaturia are two of the most constant abnormalities of the disease. The concentration of calcium in the urine may be measured by the Sulkowitch [19] test. In this test, the calcium is precipitated from the urine as the oxalate, and the degree of turbidity is graded 1 to 4. Obviously, the results will vary with the concentration of the urine and the ingestion of calcium. In hyperparathyroidism, the polyuria, therefore, may give a false picture when this rough estimate is used. The Sulkowitch test thus is useful in only a general way, and quantitative determination of urine calcium over a 24-hour period gives a more accurate measure. Individuals on the special diet devised by Bauer and Aub [20] excrete less than 100 mg. of calcium a day. Values over 150 mg. are regarded as suspicious, and values over 200 mg. are considered pathologic.

4. *Elevation of Serum Phosphatase*

The phosphatase level in the serum appears to be an index of bone repair; that is, osteoblastic activity. The level is elevated in hyperparathyroidism according to the degree of bone involvement. The normal ranges from 2 to 4 Bodansky units. In cases of classic von Recklinghausen's disease, the level is markedly elevated—sometimes as high as 16 units or more. A high level of serum phosphatase is present in many other bone conditions, but its main significance in hyperparathyroidism is the fact that when the level is high preoperatively, then postoperatively one may expect a rapid transfer of calcium from the blood to the bones with lowering of the serum calcium level and the danger of tetany. Thus the determination is less of diagnostic value, than of prognostic value regarding postoperative tetany, and a guide to the necessity for sub-total tumor resections.

DIFFERENTIAL DIAGNOSIS

Secondary hyperparathyroidism, which is a compensatory hyperplastic process of the parathyroid glands due to renal insufficiency, must be differentiated from primary hyperparathyroidism; namely, that due to tumor or primary hyperplasia of the parathyroid glands. This secondary hyperparathyroidism results in renal rickets in children or in renal osteitis fibrosa cystica in adults. The theoretical concept is that patients with chronic nephritis and renal insufficiency do not excrete phosphate normally. The phosphate ion increases in the blood, which depresses the level of calcium to subnormal levels. This in turn stimulates the parathyroids to a compensatory overactivity and cellular hyperplasia of the glands results. Cope [1] states that this hyperplasia is not rare in nephritis, but seldom is more than a mild degree of clinical hyperparathyroidism produced. However, cases have been recorded which developed classic von Recklinghausen's disease. The differentiation between the primary and the secondary forms may be very difficult. It is important, however, because in primary hyperparathyroidism, operation may prolong life, while in the secondary type with primary renal disease, parathyroidectomy may shorten life. Keating [11] states that in renal osteitis fibrosa cystica or in renal rickets, the serum phosphorus is markedly increased, often to 8 mg. to 10 mg. per 100 cc. The calcium concentration may be normal or slightly increased. The renal insufficiency is usually severe and of long standing with a history of glomerulonephritis, or polycystic kidneys.

Generalized osteoporosis, or primary bone atrophy, due to failure of osteoblastic activity is one of the bone diseases which must be considered in a differential diagnosis. This process is generally most evident in the vertebrae and pelvis, and less marked in the skull and extremities, in contrast to the bony changes occurring in hyperparathyroidism. The biochemical determinations are normal.

Paget's disease, or osteitis deformans, is not generalized although several bones may be involved. There are usually areas of normal bone to be found in this disease. Calcium and inorganic phosphorus levels are usually normal. The phosphatase concentration may be very high. Involved bones show by X-ray examination a characteristic enlargement, and the skull is thickened as well as having a moth-eaten appearance.

Solitary cysts and solitary giant cell tumors can be differentiated by their normal biochemical findings.

Multiple myeloma does not exhibit hypophosphatemia, and the phosphatase level is normal. The finding of Bence-Jones protein in the urine is of diagnostic value in this disease.

TREATMENT

I. Non-surgical Treatment

X-ray therapy has, in general, been unsuccessful. Medical treatment is not effective. Calcium, when given in large amounts, will correct the negative calcium balance and bring about improvement in the bone lesions. This is very dangerous, however, since irreparable kidney damage may result. Calcium should therefore not be given. Indeed, if surgery need be delayed for any reason, a diet low in calcium should be prescribed to protect the kidneys.

II. Surgical Treatment

In order to undertake properly the surgery of hyperparathyroidism, one must have a thorough understanding of the anatomy of the parathyroid glands, including the embryologic development and structure, as well as the pathologic changes which occur in hyperparathyroidism; namely, either adenoma or hyperplasia of all the parathyroid tissue.

A. *Anatomy*:

1. General considerations: In the usual description of the parathyroid glands, the number is given as four. However, as many as seven have been described in a given individual. In some instances, less than four have been found, although in such cases the adequacy of search might be questioned. At any rate, it is generally agreed that supernumerary glands may occur. The usual relation is two on the dorsal surface of each thyroid lobe. There is a rich blood supply derived from the branches of the inferior thyroid artery. Best and Taylor [21] state that the nerve supply is scanty and the fibers probably vasomotor in character. Secretory nerves have not been demonstrated. These writers state that the functional activity of the parathyroids is possibly controlled by a hormone liberated by the anterior lobe of the pituitary.

2. Distribution of the glands and location as determined by embryologic development and displacements of enlarged parathyroids: The parathyroid glands have a widespread distribution and a knowledge of this is essential in the hunt for the adenomas or hyperplastic glands at surgery. In series of 58 adenomas found at the Massachusetts General Hospital, and reported by Cope,[22] 11 were found in the anterior mediastinum, 5 in the posterior mediastinum, and the remainder, or 42, in the neck. In 6 cases of primary hyperplasia, 23 glands were identified at operation; all lay in the neck except one which was in the posterior superior mediastinum. Presumably the 24th gland which was not disclosed, lay in the anterior mediastinum.

(a) Embryologic development: Cope [22] gives a summary of the important embryologic aspects of the parathyroid glands as related to their location and cites the excellent accounts in the monographs by Weller [23] and Norris.[24] Enlarged parathyroid glands are found in the mediastinum because of embryologic descent of the glands or because of displacement of tumors from the neck into the mediastinum. The extreme range of location as found in the series at the Massachusetts General Hospital [22] is from 1 cm. above the upper pole of the thyroid gland down into the mediastinum as far as the pericardium.

The parathyroid glands develop as two pairs from two separate bilateral primordia in conjunction with the thyroid and thymus glands. The upper pair originate in a primordium arising from the fourth branchial cleft. The parathyroid cells appear above and behind the lateral thyroid component arising from the same cleft and descend in this relation to the lateral thyroid as it grows down in the neck to join the median thyroid component. Since the lateral thyroid component travels only a short distance during embryonic life, from just below the upper portion of the larynx to the normal thyroid position opposite the cricoid cartilage, the parathyroid IV also travels only a short distance. The upper parathyroid should therefore exist only in an area bounded above by the upper border of the larynx and below by the lower pole of the thyroid. In Cope's [22] observations at surgery, only once has a normal upper gland been disclosed below the main branch of the inferior thyroid artery. It was often encountered in the upper branches of the inferior thyroid vessels, but more often lay nearer the upper pole. On an embryologic basis, it should be situated posterior to the thyroid, but actually this is not always the case. In two of Cope's cases,[22] the upper glands were isolated anterior to the superior thyroid vessels, and they have been found between the upper pole and the larynx.

The lower parathyroids are more difficult to locate surgically because they cover a wide field in their development. The lower parathyroid develops on either side from the third branchial cleft close to the primordium of the thymus gland. The parathyroid tissue descends with the thymus tissue as the latter grows and moves downward in the neck from the pharynx to its final position in the anterior mediastinum. Weller [23] calls the parathyroid III, the "parathymus" gland because of this association. In most cases, these glands pass with the thymus lateral to the upper parathyroid and lateral thyroid component, and are dropped off opposite the lower pole of the thyroid, while the thymus continues its growth on down and deposits itself low in the anterior neck or in the chest. However, the parathyroid III may end in the anterior mediastinum still within the capsule of the thymus. Mediastinal parathyroid tumors have been found within the capsule of the thymus. Parathyroids may be found even in the lower portion of the thymus. Concerning anterior-posterior relations, the thymus descends anterior to the great arteries but not necessarily to the innominate veins. The parathyroids in the anterior portion of the superior mediastinum have borne this same relationship to the great vessels in Cope's [22] experience. He found that in the anterior mediastinum proper, only those glands that were within the thymus have actually lain in front of the aorta. Those lateral to the thymus have dropped posteriorly into the middle mediastinum, lateral to the aorta. He also states that he has not observed a true intrathyroid parathyroid, normal or tumor, although he has found the glands buried deep in the sulcuses of the thyroid.

(b) Displacements from the neck into the mediastinum: Cope [22] states that there is evidence that enlarged parathyroid glands may be displaced into the mediastinum. He gives as evidence the fact that the tumors are sometimes found in locations where they would not be expected to occur on an embryologic basis, as for example, in the posterior mediastinum; and also that all of such tumors have had long vascular pedicles leading to thyroid vessels. By contrast, the enlarged tumors in the anterior mediastinum (which location can be explained embryologically) have a local blood supply. Also, a normal gland is always found near its vascular base. The parathyroid gland, in contrast to the thyroid, is held in position largely by its vascular pedicle and is without firm fascial attachments. Thus, an enlarged gland can easily be displaced by surrounding organs. The vascular pedicle should offer little resistance to downward displacement. The theory is that the downward passage is initiated by the weight of the enlarged gland and continued as it nears the thorax by the negative intrathoracic pressure. The original position of the gland influences its final location in such instances. The upper gland goes to the posterior mediastinum, and the inferior gland also goes there if it originally lay posterior to the lower lobe of the thyroid. However, if it lay caudal to the thyroid lobe, in a more anterior plane, it might be drawn into the anterior superior mediastinum.

3. Gross anatomy and histology of the normal parathyroid glands: Churchill[10] states that there is such variation in the size and shape of the glands in normal individuals that description can only be approximate. The size is 3 to 6 mm. in length, 2 to 4 mm. in width and 0.5 mm. to 2 mm. in thickness. A single gland weighs about 0.030 Gm. The gland is soft since it is composed of the parathyroid cells and fat with little supporting stroma. There is a thin capsule with a fine network of vessels over it. The shape of the soft gland is determined by the firmer surrounding organs, and may be flattened over the surface of the thyroid or esophagus. If free in fatty or areolar tissue, the parathyroids tend to be globular, as is also the case when they are found within the thymus gland. There is a clearly formed vascular hilus. Grossly, the glands are most likely to be confused with fat, lymph nodes, or nodules of thyroid tissue. The color of the gland varies according to the fat content. But with little fat, as before puberty, the color is coffee-brown. Through middle age, the fat content increases and the color becomes yellower. In older age groups, the fat content again decreases. The normal, uninvolved glands, in a case with functioning adenoma, may be more yellow than usual because of atrophy of disuse of the parathyroid cells.

There are four main types of cells in the normal parathyroid. The *chief* or principal cell is polyhedral in shape and has a strongly demarcated, large nucleus. The scanty cytoplasm is faintly acidophilic. The "wasserhelle" or "water-clear" cell is larger and shows complete vacuolization of the cytoplasm. There is an eccentrically located nucleus which is hyperchromatic or even pyknotic. These cells are rare in the normal glands and are found in small clusters. The *pale oxyphil cell* has a uniformly acidophilic, finely granular cytoplasm with no vacuolization. The nucleus is similar to that of the chief cell. The *dark oxyphil cell* is smaller than the pale oxyphil and contains a dark red homogenous cytoplasm and a small pyknotic nucleus. It should be noted that there is an increase in the number of the pale oxyphil cells beginning at puberty, and in persons after the age of 40 to 50 years they may form large islands in the normal gland. They are circumscribed but not encapsulated. The stroma of the normal gland contains many large fat cells.

B. *Pathology*:

Cope[1] reviews the pathology of enlargement of the parathyroid glands and Castleman and Mallory[25] give a detailed description of cell types and discussion of the pathologic theory of neoplasia.

Enlargements of the parathyroid glands are due either to hyperplasia or neoplasia. Hyperfunction is associated with both conditions. There are 5 main pathologic types of enlargements which are of clinical significance.

1. Primary hyperplasia with hyperfunction: In a series of 78 cases of primary hyperparathyroidism at Massachusetts General Hospital,[1] 7 were due to a primary hyperplasia involving all four glands. Cope[1] compares this to thyrotoxicosis. The clinical symptoms in this form of the disease are the same as in the cases with adenomas. The primary hyperplastic gland can be grossly distinguished from an adenoma. The surface contours are more irregular, often with deep sulci and irregular peninsulas. The color is a deeper brown. The cells are all of one type, the Wasserhelle or clear cell. There is no fat and the cells are concentrically arranged with nuclei near the periphery. These cells are very large, and the condition may be one of hypertrophy of existing cells rather than increase in number of cells. The cells are easily recognized in frozen section.

2. Secondary hyperplasia with hyperfunction: This condition, as has been mentioned, is due to long standing nephritis or to the increased physiologic demand in vitamin D deficiency and in pregnancy. In the latter two conditions, the enlargement is not more than 2 to 4 times the normal and since all fat cells are not eliminated by compression, the color remains light brown. In chronic nephritis, however, the secondary hyperplasia is due to increase in chief cells, and no water-clear cells are seen.

3. Adenoma without hyperfunction: These are uncommon and of little clinical significance. Grossly they appear the same as those which are functioning. Cells are of the pale oxyphil type.

4. Adenoma with hyperfunction: These tumors are considered to be benign neoplasia and are the most common pathologic type encountered. In the Massachusetts General Hospital series,[1] 71 proved cases were of this type. In most cases only one of the parathyroid glands is involved. However, 5 of these 71 cases had two adenomas, one in each of two glands. Some of these tumors are very small and may occupy only a portion of the space in the capsule of the gland. In such instances, the remainder of the tissue in the gland is normal. The largest tumor reported in this series weighed 53 gm. The larger adenomas are of a more brownish color than normal tissue. Cope[1] points out that the size of the adenoma is roughly proportionate to the elevation of the blood calcium. Adenomas may be composed of one cell type or of mixtures of cell types. There are rarely fat cells in the stroma.

5. Carcinoma: Malignant tumors of the parathyroids do occur but are rare. None had been recognized at the Massachusetts General Hospital up to 1944. Cases have been reported by Meyer, Rosi, and Ragins[26] and Hall and Chaffin.[27] Carcinomas of the parathyroids may be hypersecretory.

C. *Surgical Technique*:

In surgical operations for hyperplasia or adenoma of the parathyroid glands, it is essential to be able to recognize the normal glands as well as the diseased glands, and to be thoroughly cognizant of the possible locations of the normal and adenomatous glands as has been described above. Cope [22] states that 9 of their cases, proved at operation, had previously been unsuccessfully operated upon at other hospitals; some more than once. Churchill and Cope [10] and Cope[22] have given an excellent and detailed description of the operative procedure as developed in their Clinic. They do a first stage operation which includes exploration of the neck and posterior mediastinum. And then if all of the involved glands are not found, a second stage operation is done in which the anterior mediastinum is explored by a direct approach through the sternum. They avoid blunt, blind dissection of the anterior mediastinum since failures have resulted from such procedures.

The following description of the operative procedure has been drawn largely from Cope's [22] writings on the subject.

1. First stage operation—the exploration of the neck and posterior mediastinum: A wide, collar incision is made in the lower neck and the platysma is elevated with the skin flaps. The sternomastoid muscle is dissected free from the sternohyoid and omohyoid muscles, and then the sternohyoid muscles are divided in the midline from the thyroid cartilage to the manubrium. These muscles are then cut from medial to lateral on each side, exposing the sternothyroid muscles which are divided at their insertion to the larynx. Retraction sutures are placed in the cut ends of the muscles to expose the thyroid gland. If one side of the thyroid shows any abnormal contour, that side is exposed first. An effort should be made to get into the fascial plane as near the true thyroid capsule as possible. The upper parathyroids occur in a smaller area, and so are looked for first in the region from the inferior thyroid artery to above the upper pole. The gland is to be found on the lateral, posterior or medial surface. If no gland is found, the lower pole is next explored. However, if a normal gland is found above, then the opposite upper gland is looked for next because of the usual symmetry of position. When the lateral lobes have been thoroughly searched, the dissection is extended. The area as high as the upper border of the larynx is opened and the areolar tissue as far lateral as the carotid sheath is explored. The esophagus is examined since a gland may be found between it and the trachea. If there is no vascular pedicle along the esophagus, this usually excludes the possibility of a gland in that region. Next, the dissection is carried down into the posterior superior mediastinum on either side. And finally the anterior superior mediastinum is investigated only as far as can be done under direct vision and with instrument dissection.

The finding of a *vascular pedicle* leading from a thyroid artery to the superior mediastinum may direct one to the involved gland. *Rests of thymus tissue* should be investigated since they may be found in the neck and mediastinum, and there may be adjoining or enclosed parathyroid tissue. There may be a well-defined tongue of thymus gland rising toward the lower pole of the thyroid from the anterior mediastinum and this should be thoroughly investigated. Subtotal resection of the thyroid gland should not be necessary. The parathyroids are outside the true capsule, and careful exploration of the capsule and sulci should reveal them if they are so located.

2. Second stage—the exploration of the anterior mediastinum: In order to explore the anterior mediastinum under direct vision, it is necessary to open it through the sternum. Adequate exposure can be obtained by dividing the midline of the sternum from the notch of the manubrium to the level of the third interspaces. A skin incision is made from the neck scar to below the third interspace and the midline of the sternum exposed. After division of the pretracheal fascia in the midline just above the manubrial notch and its separation from the posterior periosteum of the manubrium, a finger is inserted posterior to the manubrium and worked downward behind the sternum, pushing the pleura laterally and creating a space for cutting the sternum. An opening is then made into this space from the third interspace on one side medial to the internal mammary vessels and the pleura again reflected laterally. A Lebsche sternal knife is used to cut the sternum which is divided into two or three portions as needed. A good view of one side of the anterior mediastinum can be obtained by incising from manubrium to the third interspace on that side. If more exposure is needed, the sternum is also divided into the third interspace of the opposite side. A 45-degree angle should be used in the cut of the sternum from the midline to the third interspace, since if this need be done on both sides, more stable closure can be obtained. The extent of the mediastinal search should be from the neck down to the right auricle and upper reflection of the pericardium. The tumors may be found in the anterior space or may be displaced posteriorly on either side of the aorta, lying actually in the middle mediastinum against pleura and hilus of the lung. They may be either anterior or posterior to the innominate vein. Cope recommends closure of the sternum with stainless steel wire. All air and fluid should be removed from the mediastinum on closing, and no drainage is used.

In the second stage operation, the thymus gland should be exposed and explored. Parathyroid tissue usually does not occur at a lower level than the thymus, but normal parathyroids, as well as adenomata, may be found adjoining the thymus or actually within its capsule, as was emphasized under embryologic considerations.

3. Special considerations applicable to both stages of the operation:

(a) Size of Adenoma: The size of the adenoma may be expected to be roughly proportionate to the elevation of the blood serum calcium. With a minimal elevation a small adenoma will be encountered. If the blood calcium level is high, one may expect a large tumor which may be palpable or may displace the other organs. There is no way to differentiate between primary hyperplasia and adenoma preoperatively, and the weight of the glands in hyperplasia does not vary as directly with the calcium level as is the case in adenoma. If a large mass is found with a mild degree of the disease, one is probably dealing with primary hyperplasia, and all of the glands should be inspected carefully for evidence of hyperplasia.

(b) Multiple adenomas: About 10 per cent of the cases of hyperparathyroidism have more than one adenoma. If a small adenoma is found with a high elevation of blood calcium, one should look for a second tumor.

(c) Information deduced from examination of exposed uninvolved glands: In cases of mild hyperparathyroidism a small adenoma may be embedded within a capsule of normal parathyroid tissue. Careful comparison of this with other exposed uninvolved glands may give a clue to the presence of the adenoma.

In an otherwise normal gland, a yellower color than expected suggests adenoma in another gland.

There is considerable symmetry of position of glands on the two sides of the neck, and exposure of a normal gland on one side will suggest a gland in a similar position on the opposite side.

Primary hyperplasia may be excluded if one normal gland is found.

(d) Hyperplasia: Primary hyperplasia must be diagnosed by gross characteristics previously described, or by biopsy and frozen section.

(e) Biopsy: The use of biopsy and frozen section is very important in determining the presence and type of parathyroid tissue. If there is any doubt about the nature of the tissue, it should be examined microscopically before resection to avoid removal of normal glands.

(f) Supernumerary glands: There may be glands in excess of four in a small percentage of cases. Cope uses the following working plan. In a borderline case, if four normal glands are found, and especially if symmetrical, no search is made for a possible fifth gland. If the diagnosis is definite, search should be made. If diagnosis is doubtful and glands asymmetrical, a search should be made.

(g) Subtotal resection: In primary hyperplasia, a subtotal resection is carried out on the same principle as is subtotal thyroidectomy in hyperthyroidism. Churchill and Cope [10] remove three of the hyperplastic glands and do a liberal subtotal resection of the fourth. In 3 of the cases that they treated by this method, the amount of gland remaining was estimated as being .040 Gm. in one case and .225 Gm. in another. And in the third case they described the remaining tissue as being 7 x 4 mm. in size. A less radical subtotal resection of primary hyperplasia is indicated if postoperative tetany of the recalcification period is anticipated.

In cases of single adenoma, the ideal procedure is complete removal of the entire tumor. However, if severe tetany is to be anticipated as in case of severe bone disease and high phosphatase levels, subtotal resection should be done. Secondary operation may possibly be needed later in such cases if symptoms are not alleviated.

In cases that have had previous operations without the discovery of abnormal tissue, a subtotal excision of an adenoma found at subsequent surgery is indicated since the status of the normal parathyroids will not be known.

Sepsis or general debility increases the likelihood of tetany and indicates the need for subtotal resection of an adenoma.

D. *Postoperative Tetany, Its Prevention and Treatment:*

The danger of the development of tetany following removal of parathyroid tumors or resection of hyperplastic glands is a serious problem. The term, *tetany of the recalcification period,* is used to denote this type of involvement as compared to the simple type of tetany found in hypoparathyroidism, which occurs following accidental removal of parathyroid tissue as in goiter surgery. In the latter case, insufficient parathyroid tissue remains to meet the needs of the body. In the tetany of the recalcification period following tumor removal, there is a great demand for calcium by the bones, which have been depleted by the hyperparathyroidism. Calcium rapidly returns to the bones, and the blood level of calcium may fall to tetanic levels and remain there. In this type of tetany, the blood phosphorus level also tends to remain low and may even drop further.

Tetany of the recalcification period is to be anticipated if there is extensive bone disease. There is a high phosphatase level in the blood, and this is of value in predicting the occurrence of tetany. Cope [22] states that if the phosphatase level of the serum is 10 Bodansky units or higher preoperatively, tetany may be expected after surgery.

Prevention of tetany in cases where it is anticipated may be accomplished by subtotal resection of adenomas or less radical subtotal resection of hyperplastic glands, as has been mentioned previously. The symptoms of tetany occurring postoperatively may be controlled by the administration of dihydrotachysterol (A.T. 10) and calcium lactate orally. Flink [17] cites one case in which 1.25 mg. of A.T. 10 and 6 Gm. of calcium lactate were given orally for one month to control mild tetany. And another case received 3.75 mg. of A.T. 10 for the first month, and then 1.25 mg. per day. In this last case, the dosage of calcium lactate varied from 6 Gm. to 24 Gm. daily. Calcium gluconate may be given intravenously to control tetanic symptoms. Large doses of vitamin D may be used in place of dihydrotachysterol in the prevention and relief of tetany. Flink [17] also suggests the use of the Sulkowitch test [19] in anticipating the onset of tetany and in determining a safe dose of dihydrotachysterol. If there is no precipitate, the serum calcium level is 8 mg. per 100 cc. or lower. A heavy precipitate indicates a high level of calcium.

E. *Postoperative Course and End Results:*

The degree of bone disease present will determine the time needed for the return of serum calcium and phosphorus levels to normal. This may be a matter of a few days in mild cases, to several months in cases in which there is marked demineralization of the skeleton.

There is great improvement in the symptoms following successful operation, and Albright [15] states that the patient not infrequently remarks that he has not felt so well in years. There is a marked weight gain. Constipation is relieved. The patient becomes more energetic. The bone pain and tenderness may decrease rapidly. The decrease in radiability of the bones, however, may not occur for six months. Bone cysts may remain indefinitely although improvement may be noted. The bone tumors or osteoclastomas will improve. Impairment of renal function due to renal calcification appears to be irreversible, while, of course, renal calculi may be removed.

McClure[16] reports follow-up studies in 6 cases. Four of these which were classified as cures had been followed from 4 to 8 years and had remained well. The other 2 cases died; one from acute parathyroid poisoning without operation and the other, four months postoperatively, from a hypoparathyroid state.

SUMMARY

A review of the problem of hyperparathyroidism is presented. The historical aspects of the disease are considered. Diagnostic criteria have been pointed out. In the search for parathyroid tumors, the surgeon needs full faith in an accurate diagnosis since the exploration may be long and difficult. The operative technique, as developed by Churchill and Cope, has been presented in some detail. Hyperparathyroidism is not a rare condition but the diagnosis apparently is frequently missed. The condition is amenable to surgical attack and clinical cure can be anticipated following adequate surgery in cases which do not show irreparable kidney damage.

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American Student Health Association

The University of Alabama has inaugurated its expanded student health service. Albert Tatum, M.D., has been appointed as the director.

Glenadine C. Snow, M.D., has resigned as director of student health at the Michigan State Normal College, Ypsilanti, Michigan. V. L. VanDuzen, M.D., has been employed as the new director of student health in that institution.

Mr. J. R. Clark has been appointed to fill the vacancy left by Mr. Wesley P. Cushman at State Teachers College, Mankato, Minnesota. Mr. Clark has a Masters degree in health and physical education.

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Representatives of several universities, the District of Columbia Health Department, and the American Red Cross met at the George Washington University on September 5, 1947, to discuss health and recreational needs of married student veterans.

It was the feeling of this conference that a definite need exists for both health and recreational services for the more than 7,000 families of married student veterans of the District Area. It was also revealed that few health services were now offered except as a part of the public welfare program.

The feasibility of a special maternal care program for wives of student-veterans, as well as a program of emergency financial assistance were discussed and the possibilities of initiating such programs are being explored. A second meeting of the above group has been tentatively set for early October. Veterans service organizations who were unable to participate in the first conference are being invited to attend the second meeting.—(Bulletin No. 18, American Council on Education.)

News Items

NEWS FROM NORTH DAKOTA

Thirty-two members of the Grand Forks District Medical Society were addressed by Dr. A. Andison of Winnipeg at their first fall meeting in Grafton September 17. Dr. Andison spoke to the group on obstetrical problems. Dr. E. L. Grinnell was elected to the society's board of censors to replace the late Dr. J. E. Hetherington. Next regular monthly meeting of the group will be held in Grand Forks in October, according to President W. C. Dailey. Officers of the group, all from Grand Forks, are Dr. W. C. Dailey, president; Dr. L. J. Alger, vice president, and Dr. E. A. Canterbury, secretary-treasurer.

The First district health unit with headquarters in Minot has made commendable progress in the five years it has been in existence in the service it has rendered the general public, Dr. Carl Buck, New York City, field director of the American Public Health Association said September 17 on a visit to this city. Dr. Buck and Dr. Robert E. Rothermel, associate field director of the association, were in Minot in connection with a state-wide survey of public health facilities. The survey was requested by the state health department. The two doctors are studying detailed records of the operation of the First district health unit to discover whether it is suitable to follow as a pattern for organization of other units in the state. It is the only local full-time health department in North Dakota, said Dr. Buck. Dr. Buck said he favors organization of local autonomous health units in North Dakota, working with but not subservient to the state organization.

At the regular meeting of the Ramsey County Commissioners in the court house Tuesday and Wednesday, Dr. J. H. Mahoney was appointed county public health officer to fill the unexpired term of Dr. John Rurd, who resigned his position before leaving to attend New York University, New York.

Members of the North Dakota College of Physicians met at Bismarck in September in their first annual convention. Dr. Robert B. Radl, governor of the college, presided. Those present included physicians from Fargo and Grand Forks. Papers presented included: Mercurials and congestive heart failure—Dr. R. O. Goehl, Grand Forks. Lipemia—Drs. A. C. Fortney and W. E. Lancaster, Fargo. Functional cardiac findings—Dr. Allan Moe, Fargo.

Mrs. Milton H. Berg, Bismarck, vice president of the state medical society auxiliary, presided at the organizational meeting of the sixth district auxiliary at a luncheon meeting at the Bismarck Country club. President of the newly-organized group is Mrs. H. A. Wheeler, Mandan. Mrs. O. DeMoully, Flasher, was named vice president, and Mrs. L. W. Larson was elected secretary. Mrs. E. Vinje, Hazen, will serve as treasurer. On the program committee are Mrs. Carl J. Baumgartner, Mrs. Robert B. Radl of Bismarck, and Mrs. B. S. Nickerson, Mandan. About 35 women were present, including Mrs. R. H. Breslin, state counselor, Mandan.

NEWS FROM SOUTH DAKOTA

To further public vigilance against early cancer symptoms and to reduce the delays blamed on doctors, the South Dakota Cancer group at their second annual meeting at Aberdeen endorsed this six-point program for the coming year:

1. Seek a way to make cancer a reportable disease in South Dakota. As it is, no one knows how many cancer deaths there are each year in the state. Dr. O. S. Randall of Watertown, executive chairman of the group, said he did not believe the state Board of Health is staffed or financed to take on the added burden of reporting cancer deaths at this time, however.

2. Encourage all persons 40 or older to insist upon a thorough yearly check-up including complete case history, rectum examination, examination of female organs, blood count, urinalysis and on the first examination, a chest X-ray.

3. Send 125 South Dakota physicians, all expenses paid, to a three-day course in cancer at University hospital, University of Minnesota. Thirty-five state doctors attended the sessions last year under sponsorship of the South Dakota Cancer group.

4. Conduct a cancer symposium in Sioux Falls next spring, with sessions for both physicians and the laity.

5. Sponsor radio talks and other public appearances by officers of the state association and the physicians who attend the Minnesota lectures to explain the urgency of early-diagnosis and treatment of cancer.

6. Recommend a course in all medical schools dealing with diagnosis and treatment of cancer in the clinical, or third and fourth years.

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Dr. H. Moyer, Bismarck, North Dakota, has been appointed to head the new Kingsbury county hospital at Lake Preston, South Dakota. Dr. Moyer will assume his new post when the hospital is opened in December.

Meeting of the Sioux Valley Medical Society will be held at the Martin Hotel, Sioux City, Iowa, on January 27, 28, 29, 1948.

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Practicing physicians and surgeons in Vermillion, Yankton and Sioux Falls, South Dakota, and in Sioux City, Iowa, are doing clinical teaching for the School of Medicine at the State University this year, Dr. Donald Slaughter, Dean of the School, has announced. Students are taken by bus to the cities where the doctors are located.

Surgery, applied anatomy and clinical radiological anatomy are being taught by Dr. C. B. McVay of Yankton. Dr. F. J. Abts of Yankton is teaching the course in gynecology, and Dr. Robert Livingston, also of Yankton, is teaching the course in internal medicine.

Physical diagnosis is being taught by Dr. Hugo Andre and Dr. Harold Hansen of Vermillion. Dr. E. M. Stansbury of Vermillion teaches obstetrics, and Dr. George T. Jordan, also of Vermillion, teaches the course in examination of the eye, ear, nose and throat, which is a part of the course in physical diagnosis.

Lectures in pediatrics are given by Dr. Will Donahoe of Sioux Falls. Lectures and demonstrations to the freshmen on psychodynamics will be given during the second semester by Dr. Philip Pugh of Sioux City, Iowa, who will also give lectures and demonstrations to the sophomores on psychosomatic medicine. Dr. R. N. Larimer of Sioux City, Iowa, will give lectures and clinic demonstrations during the second semester to the sophomores in internal medicine.

Material that is difficult to get for class work is being furnished through the cooperation of Dr. Don B. Williams and Dr. F. W. Haas of the state hospital at Yankton, Dean Slaughter said. He also stated that the Sacred Heart hospital of Yankton is cooperating in furnishing classrooms and other facilities in order that the university medical students may get clinical teaching in the various subjects required.

"Wide-spread interest which the physicians and surgeons have shown in their ready and sincere willingness to cooperate in the teaching of the medical school students speaks well for the development of the four-year school," Dean Slaughter said.

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A former member of the University of Pittsburgh biology department, Dr. Earl B. Scott, has been appointed associate in anatomy at the State University medical school; Dr. H. Grant Skinner, formerly assistant professor of pharmacology at the University of Alberta, Edmonton, Canada, has been appointed assistant professor of pharmacology, and Dr. John E. Summers, formerly surgical assistant at the Goodrich General hospital in Detroit, Michigan, has been appointed associate in anatomy.

NEWS FROM MONTANA

Dr. F. F. Attix was re-elected a director of the American Congress of Surgeons at its annual clinical congress in New York City in September. It will be his fourth term of three years. The organization has 14,000 members in all parts of the world and 6,000 attended the week-long sessions, with 747 new members being initiated. Latest practices and discoveries in surgery were discussed and demonstrated as was a program for standardization and inspection of hospitals.

Dr. T. J. Fitz-Gibbon of Sioux Falls, South Dakota, formerly on the medical staff at the veterans' hospital at Fort Harrison, has been elected mine doctor for No. 3 mine at Roundup.

Appointment of Dr. Chester A. Clark as a physician at Montana State college was announced September 20. The appointment now gives the college the services of two doctors, as Dr. Carl W. Hammer, who was the first physician appointed at the college on full-time basis, is also in college service.

A meeting of the Cascade County Medical Society was held September 19. Dr. F. H. Crago presided. Dr. Eugene Hildebrand discussed the functions of the Montana Cancer Society, particularly explaining the procedure by which patients can take advantage of the services offered. Dr. Hildebrand is state chairman of the cancer body.

NEWS FROM MINNESOTA

A University of Minnesota continuation course in basic sciences for physicians reopened the first week in October after a brief summer lapse. The nine-month course—which now includes 40 students, the majority of them veterans—is headed by Dr. William A. O'Brien, director of postgraduate medical education and professor of public health. Lectures are held at the campus continuation study center, with clinics and demonstrations at the university medical school, Minneapolis General hospital, Minneapolis Veterans hospital and Ancker hospital, St. Paul. The program is partly financed by a grant from the Kellogg Foundation, Battle Creek, Michigan.

Some 150 pediatricians from Minnesota, North and

South Dakota, Iowa, Nebraska and Canada met at Bayport in September for one of three annual meetings of the Northwest Pediatrics association.

Dr. John McKelvey, chief of the department of obstetrics and gynecology at the University of Minnesota, was the principal speaker at a meeting of the Range Medical Association in Eveleth on September 23.

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The first voluntary prepaid medical service plan backed by the Minnesota State Medical Association went into operation September 29. More than 1,500 of the state's 2,700 doctors have signed up to give medical care to subscribers on a contract basis. Minneapolis is represented by 350 doctors and St. Paul by 241.

The plan, known as the "Blue Shield" service, was made available generally November 1.

"Minnesota Medical Service, Inc.," official sponsor of the Blue Shield plan, functions as an independent agency, but contracts will be handled by the Minnesota Hospital Service Association, which operates the Blue Cross hospitalization system.

Blue Shield benefits will be offered initially to groups holding Blue Cross hospitalization contracts.

Under the plan, a scale of payments has been set up to cover surgical or maternity care in hospital, office or home. Medical care—such as treatment of pneumonia and other non-surgical needs—will be paid for only if the patient is confined to a hospital.

The prescribed fee will be paid in full for an individual subscriber with annual earnings of $1,500 or less and for families within the $2,500 income range.

Employed individual and family groups with annual earnings in excess of these amounts also are eligible to join the plan, but may be charged an additional fee by the attending physician.

Minnesota Medical Service, Inc., a non-profit corporation, came into existence under an enabling act approved by the Minnesota legislature April 12, 1945.

Dr. O. I. Sohlberg, St. Paul, president of Minnesota Medical Service, Inc., said the Blue Shield plan is associated with 41 other medical care plans in the United States.

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Dr. Donald C. Balfour, 65, who came to Rochester in 1907 to join the Mayo Clinic, retired October 1 as director of the Mayo Foundation for Medical Education and Research. He now becomes director emeritus of the foundation, a branch of the University of Minnesota graduate school endowed by the late Drs. William J. and Charles H. Mayo. He will continue to serve the foundation as an adviser and as professor of surgery emeritus. He will also remain senior consultant in surgery at the Mayo Clinic. New foundation director is Dr. Victor Johnson, until last spring secretary of the council on medical education and hospitals for the American Medical Association, Chicago. He joined the foundation April 1 as associate director.

The founding of the Ramsey County Medical Society library 50 years ago was celebrated recently at a meeting in the society auditorium, Lowry Medical Arts Building, St. Paul.

Dr. R. O. Johnston has been appointed school physician in Hibbing by the Board of Education. He replaces Dr. Gordon Anderson who left early last summer to resume a practice in Montana.

Deaths

Dr. Alfred Karsted, 72, who had practiced in Butte, Montana, for the past 45 years, died October 6.

Dr. William Ginsberg, 57, of St. Paul, Minnesota, died September 21. He was a staff member of St. Luke's, St. Joseph's and Miller hospitals, and served as staff physician to the Jewish Home for the Aged.

Dr. Paul M. Gamble, 49, Albert Lea, Minnesota, last of three brothers who founded the Gamble clinic in Albert Lea, died at his home recently.

Dr. Harry Lee D'Arms, 79, who had practiced in Hector, Minnesota, for over 44 years, died in September.

Dr. John Turnbull, 76, who had practiced in the Karlstad area, Minnesota, for 40 years, died in September.

Copies of **Hospital Care in the United States** are available from the Commonwealth Fund, New York City, at $4.50 per volume.

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This 700-page volume, published by the Commonwealth Fund, sets forth an unprecedented program for expansion, improvement and coordination of American hospitals. It summarizes the entire findings of the Commission's intensive, two-year survey of hospital facilities and lists 181 specific recommendations for the future development of hospital care in the United States.

According to Dr. A. C. Bachmeyer, M.D., director of the study, the report urges broadening of financial support, strengthening of services and increase of availability of hospital care so that a complete and systematic service will be the heritage of the new generation. Graphs, charts, outlines statistics, work formulas and authoritative comments by hospital and public health specialists cover every phase of hospital care.

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Brain Tumors: Value of Early Diagnosis

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Rochester, Minnesota

It should be necessary only to re-emphasize the importance of an early diagnosis of brain tumor since all physicians know the devastating effects it produces. It is obvious that these effects will be less if the lesion is recognized early in its development, is of an operable type and is removed. Members of the medical profession have learned that the prognosis in all cases of brain tumor is not hopeless. The patient is willing to undergo operation on the advice of his doctor and rarely holds to the superstition that craniotomy always results in fatality. The responsibility is the physician's if the condition becomes more severe and the patient is not given a thorough examination and an opportunity for early treatment.

In diagnosis of an organic intracranial lesion, it is extremely important to proceed in an orderly manner by taking the history carefully and by conducting physical, neurologic, ophthalmologic, roentgenographic and selected laboratory examinations. It is impracticable to rely on special measures, such as pneumoventriculography or pneumo-encephalography, to the exclusion of evidence elicited in the course of the routine examination.

A thoroughly taken history is invaluable when working out a differential diagnosis. General examination further assists in distinguishing between coexisting diseases; neurologic examination discloses mental states, normal or abnormal reflexes and motor and sensory findings. Ophthalmologic examination reveals the condition of ocular movements, the presence or absence of pathologic conditions of the ocular fundi and visual fields, such as ocular palsy, papilledema, optic neuritis, optic atrophy and defects in the perimetric fields. These data aid in confirmation of the impressions obtained at neurologic examination. On roentgenographic examination, which includes making ordinary and stereoscopic roentgenograms, evidence of erosion, convolutional markings, hyperostosis, inflammatory lesions of the skull and deposits of calcium in neoplasms and vascular lesions can be found.

Pneumo-encephalography is of value in showing the evidence of convolutional destruction and cerebral atrophy in traumatic and circulatory disease, and ventricular deformities in circulatory, neoplastic and congenital lesions, but it may be a dangerous procedure if a cerebral neoplasm is present. Pneumoventriculography has become used widely and is valuable in the localization of tumors early in their growth and in silent areas. Occasionally it is used preliminary to operation to estimate the size and depth of localized tumors.

Electro-encephalography is one of the newer procedures employed in the localization of cerebral lesions. The purpose of making an electro-encephalogram is to determine if the normal brain waves have been disturbed by a neoplasm. Present knowledge of electro-encephalography makes it a reasonable aid in the differential diagnosis; however, it is not infallible.

The choice of laboratory tests depends on the history of coexisting diseases and the physical and neurologic findings. Spinal puncture and examination of spinal fluid are indicated if trauma has occurred and circulatory and inflammatory lesions are present, but only occa-

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Read before the meeting of the North Dakota State Medical Association at Bismarck, May 26 and 27, 1946.

*From the Section on Neurosurgery, Mayo Clinic, Rochester, Minnesota.

sionally if cerebral neoplasms are present. These procedures reveal the presence or absence of blood, intraspinal pressure and the presence or absence of organisms and furnish valuable information concerning changes in protein content, other chemical changes in the fluid, and the number and morphology of the cells. In cases in which the presence of syphilis and parasitic lesions is suspected, the serologic test of the spinal fluid offers material assistance in arriving at a diagnosis. Spinal puncture is contraindicated in the presence of increased intracranial pressure when papilledema is of more than 2 diopters.

SYMPTOMS OF INCREASED INTRACRANIAL PRESSURE

The early signs of increased intracranial pressure are headache, vomiting and choked disks. It is not necessary for all three to develop simultaneously, but sooner or later they all will be present. Symptoms of pressure due to tumors situated in the region of the optic chiasm, in the corticosensory and motor areas, and in the cerebellopontine angle are the exception since symptoms of localization develop before those of increased intracranial pressure.

If the patient is ambulatory, headache occurs daily in the early morning hours and frequently awakens the patient about 4 A.M. Vomiting is of the projectile type and is often associated with headache and with movements of the head. Pain in the occiput associated with rigidity of the neck are accompanying symptoms of infratentorial tumors. Papilledema, or choked disks, may be confused with edema of retrobulbar neuritis, but when associated with headache and vomiting increased intracranial pressure is invariably present. However, tumors situated in the sella turcica or in the chiasmal region which produce direct pressure on the optic nerves will cause pallor of the optic disks instead of edema. When they grow to sufficient size to obstruct the free flow of cerebrospinal fluid in the ventricles and subarachnoid spaces, edema of the disks will be followed later by secondary optic atrophy. Lesions that obstruct the third and fourth ventricles produce a high degree of, and rapidly progressing, choked disks.

SYMPTOMS OF LOCALIZATION

The syndromes of tumor vary considerably according to position, rate of growth, size and pathologic features. Each group produces a chain of symptoms peculiar to its own life cycle. It is apparent that lesions of the frontal lobes will give rise to psychic and personality changes. Those arising in the speech and motor centers will produce aphasia, apraxia, jacksonian convulsions, convulsions of the grand mal type, monoplegia and hemiplegia. Other symptoms develop as respective centers, nuclei and tracts become invaded or destroyed or deprived of their normal blood supply by indirect pressure.

In considering the differential diagnosis it must be borne in mind that certain features in the symptoms resulting from cerebral trauma, inflammatory diseases and suppurative diseases may resemble those of tumor. Therefore, it is important to obtain a thorough chronologic history to elicit differential diagnostic facts. The symptoms of cerebral arteriosclerosis rarely are confused with those resulting from tumor, since evidence of increased intracranial pressure is lacking. Occasionally cerebral thrombosis of slow progression, subdural hemorrhage and intracerebral hemorrhage may readily produce symptoms simulating tumor, and require surgical intervention in order that proper surgical treatment may be administered in cases of frank hemorrhage and that an operable tumor may not be overlooked.

BRIEF DESCRIPTION OF BRAIN TUMORS

Meningioma. Tumors of this type fall into three groups: (1) those that develop along the large sinuses; for example, along the longitudinal and lateral sinuses; (2) those that develop under the brain in the fossae of the skull; (3) those that develop over the surface of the brain. These tumors grow slowly, vary in pathologic structure and develop from clusters of arachnoid cells and villi. They are rounded, encapsulated, lobulated masses, usually singular and they vary in size from that of a pea to that of a large-sized orange. The exceptions are that occasionally the tumors are flat and thin, may be multiple and may take on malignant changes. They invariably are adherent to the dura, even though they originate within the arachnoid.

Parasagittal meningioma. These tumors usually are confined to one side of the falx, but they extend to the other side often enough to require exploration if the longitudinal sinus is found to be thrombosed or filled with tumor cells. The overlying portion of the skull is usually hypertrophied and evidence of a parasagittal osteoma is present. The osteomas vary in size, depending on the duration of the presence of the tumor. The hypertrophied bone is always invaded by tumor cells; occasionally, the invasion is so extensive that parts of the osteoma have been replaced with tumor tissue. Now and then the dura is free from bony attachments but it is usually adherent in the center of the tumor to a small spicule or prominence that grows from the inner table of the skull into the tumor.

Basal meningioma. Basal meningiomas have a predilection for the anterior fossa although they do occur in the middle and posterior fossae. Their behavior is similar to that of tumors which develop along the sinuses, in that they vary in size and structure and produce exostosis in the floor of the skull. Those that develop in the olfactory groove or in each half of the anterior fossae frequently grow to tremendous size before symptoms are observed, since the frontal lobes are capable of displacement. The meningiomas arising on the anterior crest of the sella turcica and sphenoidal wings produce visual defects early in their course. Some of these will extend into the orbit and produce proptosis. Meningiomas in the middle and posterior fossae produce symptoms according to their anatomic positions.

Meningiomas that develop on the surface of the cerebral hemispheres and cerebellar lobes represent the smallest group of encapsulated tumors. They also represent the most successful group from a surgical standpoint, since they are most accessible and operable.

Gliomas. Pathologically, gliomas are classified according to their histologic structure and degree of malignancy. Surgically, they are grouped according to accessibility and degree of malignancy. Those that are situated wholly within the silent areas are removed with the surrounding portion of brain. Those that are situated in regions such as the frontal, temporal, and occipital lobes, postcentral areas or in the cerebellar lobes can be removed with the surrounding portion of brain without seriously incapacitating the patient. Those that are situated in the motor cortex require more conservative treatment such as subtotal resection from within the tumor, to avoid increasing the existing motor disturbances. Resection of cerebral hemispheres has been performed, but carrying out of this procedure should be limited to a small group of cases since a tumor that requires such extensive resection usually has invaded the basal ganglia and, unless they also are excised, removal is incomplete. Furthermore, I doubt if many patients would appreciate the extended period of life if they knew that they would suffer spastic, partial or complete hemiplegia for their remaining years. Deeply placed subcortical tumors involving basal nuclei are situated beyond the reach of the surgeon.

Oligodendroglioma and astrocytoma. These tumors represent the most benign types of gliomas. They grow slowly and often degenerate in the center. The astrocytoma may degenerate to such an extent that nothing remains but a mural nodule. Following evacuation of the cystic content, which consists of yellow, syrupy fluid that coagulates on exposure to air, the mural nodule often can be removed completely and cure can thus be effected. These tumors occur in all parts of the brain and at all ages, although they do occur in the cerebellar lobes and vermis more frequently before the age of fifteen years than they do after that age.

Spongioblastoma multiforme. These tumors represent the average malignant type of glioma. They grow rapidly, are very vascular, and have less tendency to degenerate and become cystic. Their total removal depends on their being situated in a region from which tissue can be removed with the tumor.

Medulloblastoma. Medulloblastomas represent the most malignant group of all gliomas. They cannot be enucleated. Partial resection occasionally is advisable when the tumor obstructs the fourth ventricle.

Angioma. Angiomas are moderately well circumscribed and frequently are situated so that subtotal or total removal can be accomplished.

Acoustic neuroma. Acoustic neuromas develop within, or from neural sheaths of, the eighth cranial nerve. Acoustic neuromas grow slowly, and most of them undergo fatty degeneration in one part while growth continues in another part. If the tumor were always recognized early, it could be removed entirely by sectioning the nerve on each side of the tumor, but, unfortunately, it is rarely diagnosed until it has eroded the bone about the internal auditory meatus, and has indented and displaced the pons and overlying cerebellar lobe. Associated with the growth of the tumor are increased blood supply and numerous adhesions. Other cranial nerves are often displaced and may be found passing over the surface of the tumor. Hence, its free removal is complicated. An attempt to deliver the tumor by evulsing the eighth nerve too often gives rise to uncontrollable hemorrhage and to injuries to the seventh, ninth and tenth cranial nerves and to the pons to merit adopting such a procedure widely. The safer operation is the intracapsular enucleation through a unilateral suboccipital craniotomy.

Tumors of the ventricles. Ventricular tumors arise from the choroid plexus and ependyma, but may rise from the adjoining cerebral structures and bulge into the ventricular system. Tumors originating in the choroid plexus and ependyma often are pedunculated and permit complete removal, whereas those developing from the brain and extending into the ventricle are sessile, gliomatous and rarely are operable. Tumors of the lateral ventricle are not easily recognized clinically. The routine roentgenogram will show calcareous lesions of the choroid plexus, but it usually requires a ventriculogram to determine the situation and size of the tumor.

Tumors of the third ventricle are very similar in type to those which develop in the lateral ventricles, except that they produce rapid progression of internal hydrocephalus, inasmuch as they block the normal flow of cerebrospinal fluid. They are less accessible than tumors of the lateral ventricle. The best approach is through a dilated lateral ventricle. The approach from the right side is preferable to that from the left because the psychic and speech centers are situated in the left frontal lobe and in Broca's area, respectively. The third ventricle is entered after division of the septum pellucidum. Again, pedunculated tumors and cysts are the only tumors that are removable.

Tumors of the fourth ventricle, like other ventricular tumors, arise from the choroid plexus, ependyma and surrounding tissues such as the nuclei, peduncles and vermis. Pedunculated and circumscribed tumors are removable, as are some tumors of the vermis, but removal of any tumor of the fourth ventricle is a hazardous procedure and requires the most delicate manipulation. Tumors that bulge into the fourth ventricle from the cerebellar lobe may be removed when the cerebellar tissue can be removed with the tumor. Tumors that grow from the floor of the ventricle are difficult to manage, and the most that can be accomplished surgically is decompression that includes bilateral suboccipital decompression with longitudinal incision of the vermis. Occasionally, subtotal resection of the tumor is performed to relieve the obstruction at the lower end of the aqueduct.

Pituitary tumors. Pathologically, these tumors too are classified into numerous groups, but surgically they fall into two groups; those that are accessible and removable, and those that are nonaccessible or are malignant. Pituitary tumors invariably erode the sella turcica and clinoid processes, but sooner or later they grow beyond the sella turcica. The adenomas usually extend upward and backward between the optic nerves and under the chiasm, and produce typical bitemporal hemianopsia with optic atrophy. As the growth continues or becomes cystic, it extends laterally under the optic nerves and vessels, or it may grow upward and then over the chiasm under the temporal lobes or into the third ventricle blocking the foramina of Monro, giving rise to internal hydrocephalus, choked disks, loss of vision in nasal fields and complete amaurosis.

Metastatic tumors. Metastatic tumors are usually multiple and frequently are associated with other manifestations of metastasis. Removal of a single large nodule may give temporary relief, but it is doubtful if surgical intervention is justifiable. Decompression is occasionally resorted to, but the relief obtained, again, is of such short duration that carrying out the procedure is scarcely justified. Roentgen-ray therapy occasionally gives temporary relief; therefore, a therapeutic trial may be indicated.

Surgical Consideration

Surgically brain tumors are placed in two large groups; one includes the encapsulated and accessible infiltrating tumors and the other includes the diffuse, infiltrating and inaccessible tumors. It is apparent that the encapsulated accessible tumor lends itself best to surgical removal; however, the infiltrating tumor, when situated in a silent area, also can be removed by removing tissue about the tumor. More often than not, in the group of nonencapsulated tumors, the surgeon is compelled to perform subtotal resection, removing necrotic, cystic material with mural nodules and tumor masses from within the tumor in order to avoid increasing the existing paralysis. Radical resections of diffuse infiltrating tumors are avoided if their removal may cause hemiplegia. I prefer to secure a shorter period of relief and preservation of more normal function than an extended, indefinite period of relief and spastic hemiplegia. Decompression should never be substituted for removal of tumor when it is at all possible to perform radical operation, but decompression does serve as an auxiliary measure in subtotal resection of tumors and serves as a measure of temporary relief in the treatment of many inoperable tumors.

Inoperable tumors developing in or involving the corpus callosum, basal nuclei, brain stem, pons and medulla present difficult surgical problems, since their removal is impossible and little, if any, relief is accomplished with decompression. Many of these tumors are of the variety known as medulloblastoma and spongioblastoma multiforme. Radiotherapy offers temporary relief. Treatment with high-voltage roentgen rays constitutes the most suitable type of therapy for adults who will co-operate, since it can be administered in massive doses in a short period. Radium is most suitable in treatment of similar lesions of children or un-co-operative patients, since the blocks of radium can be bandaged on the heads of patients. It always should be remembered that radiotherapy may increase symptoms for the first ten days due to swelling and edema of tumor cells. Treatment of these symptoms may require dehydration, which can be accomplished by limitation of intake of fluids and administration of diuretics and saline cathartics.

FOUNDATION AWARDS 4 GRANTS FOR NUTRITIONAL STUDIES

Four grants-in-aid amounting to $32,800 were voted by the National Vitamin Foundation, Inc., for nutritional studies, according to Dr. Robert S. Goodhart, Scientific Director. Awards were approved by the Board of Governors, of which Dr. Theodore G. Klumpp, president of the Winthrop Chemical Company, Inc., is chairman, effective July 1, 1947. Additional financial grants will be announced at the Foundation's semi-annual fall meeting, Dr. Klumpp stated.

A grant of $13,000 went to the Philadelphia Lying-in Hospital to determine the significance of nutrition and nutritional deficiencies in pregnancy. The University of Vermont School of Medicine received $5,800 for a nutrition survey being conducted on the school children of Burlington, Vt. The University of Southern California School of Medicine was awarded $6,000 for a study of the role of nutrition in specific immunity and hypersensitivity. Finally, a grant of $8,000 went to New York University for the study of the relation of pantothenic acid to the adrenal gland and carbohydrate metabolism.

Presently in effect, Dr. Goodhart said, are ten grants-in-aid voted by the Foundation during 1946 to nine universities and one state institution for the conduct of studies on the relation of nutritional factors to various vital phenomena in the human subject and experimental animal.

Surgical Relief of Pain*

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The ideal and logical treatment for any pain is the removal of its cause. Unfortunately, this is all too often impossible, either because we do not know the cause, as in trigeminal neuralgia, or because this cause, though known, lies beyond our curative powers, as in metastatic malignant disease. In such instances, if the pain is severe and unrelenting, we may have recourse to attempts to prevent the pain-producing stimuli from reaching consciousness by interrupting them at some point along their pathway.

A number of surgical methods of achieving this end are available. My purpose is to review them, together with the indications for their use and something about their liabilities. It will be seen that in every instance the patient must accept some risk and certain unpleasant sequelae in order to obtain freedom from his pain. The procedures are advised only when the trade is clearly to the patient's advantage.

Interruption of Peripheral Nerves

The most obvious method of interrupting the pain-conducting pathways is to interrupt the peripheral nerve supply of the painful part. The usefulness of this procedure is limited by several considerations. Only seldom is a painful area supplied by a peripheral nerve or nerves which are readily accessible to the surgeon. Most peripheral nerves, at least in their larger trunks, contain both motor and sensory fibers. Cutting them produces both motor and sensory paralysis which in an extremity is very disabling. Finally, peripheral nerves have marked regenerative powers so that relief of pain is in most instances temporary.

There are, however, certain well-established indications for interruption of peripheral nerves, either temporarily by the injection of procaine or more permanently by the injection of alcohol or surgical division.

Trigeminal neuralgia may be relieved for periods of many months by alcohol injection into the involved branches of the fifth cranial nerve. These may be made superficially at the infraorbital and supraorbital foramena or more deeply into the second and third divisions of the nerve as they emerge through the base of the skull. In case of pain in the first division, avulsion of the supraorbital nerve through a small incision in the eyebrow region is often practiced.

The pain of acute herpes zoster is relieved, often permanently, by the blocking of the involved nerves (fifth cranial or intercostal) with procaine. The same procedure is less effective but worth a trial in post-herpetic pain of not too long standing.

Obscure pains in the thoracic wall may follow pulmonary and pleural infections. They may be benefited by intercostal nerve blocks with procaine. The skin over any discrete tender areas there should be locally infiltrated at the same time.

Ischemic pain in the lower extremities resulting from obliterative vascular disease has been relieved by crushing the sensory nerves to the foot at convenient levels in the leg. This may provide a measure of comfort pending the inevitable amputation.

Sensory (Posterior) Rhizotomy

Proceeding centrally, the next mode of attack is by surgical division of the sensory fibers as they enter the spinal cord or brain, a procedure known as sensory or posterior rhizotomy. This method has the advantage of permanency, for if sensory fibers are divided contral to their dorsal root ganglia no regeneration follows. It also avoids the motor paralysis which follows section of a mixed peripheral nerve. Exposure of the sensory roots requires a major operative procedure, either laminectomy or craniectomy. Fortunately, the risk and morbidity of these operations has been brought to a very low level by modern surgical, anesthetic and chemotherapeutic methods.

To be suitable for relief by rhizotomy a pain must be confined to a definite anatomical area so that the exact sensory roots to be sectioned can be accurately determined. It will be recalled that there is considerable overlap in the sensory distribution of adjacent spinal nerve roots. In order to be certain of rendering a given point anesthetic, it is necessary to cut not only the nerve root supplying the area in question but also the nerve roots lying next above and below it. It is readily seen that if a painful area is too extensive, the applicability of rhizotomy is limited by the size of the operative exposure which would be required.

Further, a still useful extremity cannot be rendered completely anesthetic without loss of muscle tone and coordination even though the motor fibers remain intact. If the extremity has been amputated or is otherwise rendered useless, this consideration does not apply. Posterior rhizotomy is useful chiefly in relieving chronic pain about the head, upper extremities and thorax.

Trigeminal neuralgia is permanently relieved by intracranial section of the sensory root of the Gasserian ganglion. Glossopharyngeal neuralgia is similarly relieved by sectioning of the ninth cranial nerve in the posterior cranial fossa.

The pain of incurable malignancies about the face, jaw, pharynx and throat may be relieved by a combined operation exposing the posterior cranial fossa and the upper cervical spinal canal. The fifth and ninth cranial nerves and upper three or four cervical sensory roots may then be sectioned through a single operative exposure. This procedure is best adapted to unilateral lesions.

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*Inaugural thesis presented at the meeting of the Minneapolis Academy of Medicine, April, 1947.

Pain of malignancy at the root of the neck and in the upper extremity and thorax may be relieved by appropriate rhizotomy. Chronic intercostal pain following pulmonary disease and not responding to intercostal nerve block may be similarly relieved. However, chronic pain persisting after attacks of herpes may not be relieved even though the painful area is rendered completely anesthetic by rhizotomy.

Subarachnoid Injection of Alcohol

This procedure, which enjoyed a brief period of popularity about ten years ago, depends upon the fact that alcohol is lighter than cerebro-spinal fluid. The patient is placed in such a position that the sensory roots to be treated are uppermost, and a small quantity (0.5 to 1.0 cc.) of absolute alcohol is slowly injected through a spinal puncture needle. The alcohol exerts a selective destructive effect on the fine, thinly myelinated pain conducting fibers and tends to spare the larger motor fibers. Unfortunately, the proper placement of the alcohol is a good deal more difficult than it sounds. Results were frequently disappointing from two directions, ineffectual or brief relief of pain and involvement of motor function, particularly that of the vesical and rectal sphincters. The procedure has been largely abandoned.

There is, however, one situation in which a modification of this procedure is most useful. This is in terminal cases of carcinoma in the pelvis producing much pain in the perineal region. The patient is placed in position as for hemorrhoidectomy, *i. e.*, with buttocks uppermost. One cubic centimeter of absolute alcohol is injected through a spinal puncture needle inserted in one of the lower lumbar interspaces. The patient is allowed to remain in position for two hours after injection. Profound anesthesia of the perineal (saddle) area and relief of pain in that area is produced. The bladder and rectal sphincters will be paralyzed but this is usually of minor importance.

Anterolateral Chordotomy

The object of this procedure is interruption of the pain impulses as they ascend the spinal cord in the lateral spinothalmic tract. The spinal cord is exposed in the upper thoracic region and cuts are made in one or both anterolateral columns with a fine knife. The result is to render the opposite side of the body, below a level a few segments below that of the cut, insensitive to pain and thermal stimuli. Appreciation of touch, position sense and motor power are not altered. If the chordotomy is bilateral, there may be temporary or permanent urinary retention requiring catheterization and the male is rendered impotent. Unilateral chordotomy rarely produces such sequelae. Chordotomy carries little risk to life; the risk of motor paralysis due to inadvertent drainage to the pyramidal tracts is somewhat greater, but fortunately this complication usually proves to be temporary.

Chordotomy is indicated for the relief of intractable and incurable pain in the lower extremities, pelvis and abdomen, particularly if it be unilateral. For such purposes, the cuts are made at the second or third thoracic level. For pain in the upper trunk and upper extremities a chordotomy in the upper cervical cord (unilateral only) can be done, but rhizotomy is usually to be preferred.

Chordotomy is usually carried out for the relief of pain produced by malignant disease but is useful also for other intractable pains, as those of the gastric crises of tabes dorsalis, chronic arthritis, spinal arachnoiditis, etc.

Both chordotomy and rhizotomy should be carried out at a time when the patient's general condition is still fairly good and while his presumable longevity justifies the performance of a major operative procedure.

Sympathectomy

Sympathectomy is best known in the treatment of various forms of vascular disease. Many of these are characterized by more or less pain, and such relief of pain as is obtained following sympathectomy presumably results chiefly from improved circulation. In another group of conditions relief of pain may result from division of the sensory fibers which are found in the sympathetic nerves. The distribution of these sensory fibers is to the blood vessels and viscera. They enter the spinal cord through the posterior roots, their cell bodies being in the posterior root ganglia. It should be noted, however, that they may ascend or descend the sympathetic trunk for a distance before entering the spinal cord. Thus, the spinal segmental level of sympathetic sensory innervation may not correspond to the somatic segmental level of other nerves supplying the same part. This may account for the failure of posterior rhizotomy to relieve pain even though rendering the painful area at least superficially anesthetic, for example, in post-herpetic pain.

The applicability of sympathectomy in any given situation may be readily determined by the performance of a temporary sympathectomy by means of procaine block in the desired region, thoracic or lumbar. The technic of these injections, particularly that for the lower extremities, is relatively simple and these procedures should be in the armamentarium of many more physicians than presently employ them.

Causalgia is perhaps the best example of a painful condition best treated by sympathectomy. Described during the Civil War by Weir Mitchell, it is a peculiarly unpleasant and unbearable constant burning pain coming on shortly after incomplete injury of a peripheral nerve, most often the median or tibial nerve. The sensory area of the involved nerve becomes hypersensitive to all forms of stimuli and the skin becomes thin and glazed. Because of the minor degree of actual nerve injury the patient is often accused of malingering or of being neurotic. Experience has shown that measures directed toward the injured nerve, (resection, neurolysis) are usually quite ineffectual in relieving the pain. Sympathectomy, on the other hand, is almost a specific form of treatment. Some patients will respond to one or more procaine blocks, but most will require surgical sympathectomy.

Causalgia states are painful conditions of the extremities which follow trauma which may or may not appear to have involved the peripheral nerve trunks. While not fulfilling all the diagnostic criteria of W. Mitchell's causalgia they are clearly related and are equally responsive to sympathectomy. In the presence of an obscure post-traumatic pain in an extremity, sympathetic block is clearly indicated.

Phantom limb pain is another condition which is most distressing both to the patient and to his doctor. Fortunately, it is rare, although 90 per cent of persons suffering amputation of an extremity have some awareness (though not painful) of the missing part. Pain in the missing member may sometimes be alleviated by resection of amputation stump neuromata. Should this be ineffectual or should the pain subsequently recur, sympathetic block and sympathectomy offer the best prospect for relief.

In any of these chronic painful states, the prospect of relief from sympathectomy, or in any other fashion for that matter, decreases with passage of time. Presumably the central nervous system forms painful "habit patterns" which can no longer be interrupted by an attack upon the peripheral or sympathetic nerves. Therefore, it is well to avoid too much procrastination and adopt more radical methods of treatment while they still have a fair chance of success.

Prefrontal Lobotomy

When a chronic pain, not due to malignant disease, completely dominates a patient's life and, in effect, renders him a total invalid, drastic measures are warranted. Prefrontal lobotomy has produced some of its most spectacular results in the treatment of patients whose thinking is dominated by a single thought or group of thoughts, so-called obsessive-compulsive individuals. An obvious corollary was its application to the treatment of chronic pains which have become so fixed in the patient's mind as to constitute the sole object of his attention and, indeed, the dominating reality of his life. Prefrontal lobotomy is a safe and relatively harmless procedure and has been used to great advantage in a few such cases.

These, then, are some of the surgical methods which are available to us for the relief of chronic, intractable pain. They are relatively safe, can do much for many people, and deserve a wider application than they presently enjoy.

YOUR DIRECTORY INFORMATION CARD

Preparations are now being made to publish the new (18th) edition of the *American Medical Directory*. The last edition of the Directory was issued late in 1942. Since that time, it has been impossible to publish a new edition because of wartime restrictions and the shortage of paper and labor.

About November 15, a directory card was mailed to every physician in the United States, its dependencies, and Canada, requesting information to be used in compiling the new Directory. Physicians receiving an information card should fill it out and return it promptly whether or not any change has occurred in any of the points on which information is requested. It is urged that those physicians also fill out the right half of the card, which information will be used exclusively for statistical purposes. Even if a physician has sent in similar information recently, mail the card promptly to insure the accurate listing of his name and address. There is no charge for publishing the data nor are physicians obligated in any way.

The Directory is one of the most important contributions of the American Medical Association to the work of the medical profession in the United States. In it, as in no other published directory, one may find dependable data concerning physicians, hospitals, medical organizations and activities. It provides full information on medical schools, specialization in the fields of medical practice, memberships in special medical societies, tabulation of medical journals and libraries, and, indeed, practically every important fact concerning the medical profession in which anyone might possibly be interested.

Therefore, should any physician fail to receive one of these Directory Information cards by December 1, he should write at once to the Directory Department requesting a duplicate card be mailed.

Staphylococcus Pneumonia and Empyema

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Staphylococcus pneumonia in children has become increasingly more important during the past ten years. This may be ascribed to greater emphasis being placed on etiologic diagnosis, and since the advent of the sulfonamide drugs, differentiation of staphylococcal from other types of lung infection has become more apparent. The subject has received consideration by a number of authors who have stressed the high mortality and refractiveness of this disease to sulfonamide therapy.

Staphylococcus pneumonia is common in infants; 75 per cent of all cases occur in children under one year of age. Early empyema is the rule, occurring in practically all of the cases; pyopneumothorax develops in a majority of cases. The staphylococcus accounts for about 90 per cent of all empyema cases under six months of age, for about 45 per cent in all infants under two years of age, but for only 7 per cent of empyema cases in older children. Apparently a relative increase in the incidence of staphylococcus empyema has occurred as a result of the reduction in the number of cases of empyema due to pneumococci and streptococci since the use of sulfonamide drugs.

The prognosis of staphylococcus pneumonia and empyema prior to the advent of penicillin was very grave. Kanof, Kramer, and Carnes [1] in 1939 reported a mortality of 70 per cent in a series of 16 infants less than one year of age. In 1942, Clemens and Weems [2] reported a series of 6 infants below the age of two years; all of these died despite chemotherapy. In summarizing the experience of Babies' Hospital from 1922 to 1943, Riley [3] reported a gross mortality of 34.5 per cent in 29 cases occurring in children up to thirteen years, and 55 per cent in 9 infants under three months of age. The greater severity of this illness in young infants has also been noted by Hochberg and Kramer [4] in 1939 and by Ladd and Swan [5] in 1943. The latter observers reported a mortality of 66.7 per cent in 12 patients younger than four months and 4.8 per cent in a series of 21 patients older than four months. Forbes,[6] in 1946, reporting on experiences at the St. Louis Children's Hospital before penicillin was used from 1934 to 1943, reports that of 14 infants under three months, 42.8 per cent died; of 6 between three months and six months, 16.7 per cent died; of 7 between six months and twelve months, 57.1 per cent died, and of 15 over one year of age none died.

Penicillin therapy had lowered the mortality of staphylococcus infections to 20 per cent or less according to Anderson and Keifer [7] in 1944. Phillips and Kramer [8] in 1945 reported five cases of staphylococcus pneumonia and empyema treated by penicillin in infants under three months of age with but one death, a mortality of 20 per cent. There are many other such favorable reports in the literature. From my own experience at the Doernbecher Hospital for Children there has occurred but one death in seven cases of staphylococcus pneumonia and empyema treated with penicillin and surgical drainage.

PATHOGENESIS

The term staphylococcus pneumonia should be reserved for that form of suppurative bronchopneumonia in which bronchogenous invasion of the lung is presumed to have taken place. All forms of hemotogenous staphylococcus invasions of the lung are excluded. The infection descends from the upper respiratory passages and progressively involves the trachea and bronchi. It then extends by way of the lymphatics and interstitial tissues to reach the pulmonary parenchyma. The extension by bronchial pathways accounts, first, for the peripheral location in the lung of the suppurative lesion and, second, for the segmental distribution of the pathologic process. Bronchial fistulas have been demonstrated in the great majority of cases, giving evidence that the pathway of infection is bronchogenic. In contrast, pulmonary lesions of hemotogenous origin only rarely lead to bronchial fistula.

The disease is usually produced by a synergestic virus and bacterial invasion, descending from the upper respiratory tract. Scadding [9] in 1937 was the first to demonstrate in a case of fulminating pneumonia the coexistence of the staphylococcus and the virus of influenza. Stokes and Wolman [10] in 1940 reported a case in which they, too, were able to isolate the virus of influenza and staphylococcus aureus from the lung. Finland, Strauss and Peterson [11] and Michael [12] in an epidemic of influenza in Boston during 1942 demonstrated the etiologic significance of the influenza virus by neutralization tests in a number of cases of staphylococcic pneumonia. The incidence and high mortality of this disease during infancy suggests an abnormal pathologic and immunologic response in infants to staphylococcus infections There are two studies which bear directly on this problem. Kobak and Pilot [13] using a staphylococcal filtrate to test skin sensitivity, found that 98 per cent of the mothers reacted positively, while none of their new-born infants showed positive reactions. At three months of age approximately 3 per cent of the infants reacted, at 4 months approximately 5 per cent, while in the succeeding months the percentage rose until at one year, 75 per cent of the infants gave positive reactions. Bryce and Burnett [14] demonstrated a constant age variation in titer of staphylococcal antihemolysins in the blood serum. They found that at birth the titer is usually high but falls rapidly to almost zero at about the second month, after which it rises sharply again until by the age of four or five years it approximates the average adult level. Thus, definite differences between neonatal and older infants and children have been shown. This may help explain the increased susceptibility of infants to staphylococcal infection.

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Pathology

The pathological lesions reveal destruction of the lung architecture with the formation of multiple abscesses arranged in clusters about bronchioles. At times they may coalesce to form a large solitary pulmonary abscess. The location of these abscesses in the periphery of the lung and their restriction to bronchopulmonary segments are features of considerable significance. Thus, empyema or pyopneumothorax secondary to rupture of a pulmonary abscess is a frequent complication. There is a decided tendency toward the formation of adhesions, with the development of loculations and the walling off of staphylococcic pleural infections. Abscess formation may be absent; widespread patchy lesions of a hemorrhagic pneumonic process are found more frequently in early infancy; large abscess formation is more frequent in older children. The principal lesions of the respiratory tract regarded as influenzal are extensive and may cause severe injury to the bronchi and bronchioli with desquamation and necrosis of epithelium, exudation into the interstitial, peribronchial and perivascular tissues, focal necrosis of alveolar walls, and intra-alveolar hemorrhage. Superimposed on this lesion one notes varying degrees of suppuration, characteristic of invasion by pyogenic organisms.

Clinical Aspects

The onset is most often acute, preceded by a short upper respiratory infection with fever, cough, rapid breathing and listlessness. The temperature often runs a high sustained course of about 105° F, producing a clinical picture not unlike pneumococcal pneumonia. However, a very irregular temperature may be encountered. The clinical picture is that of profound toxemia with marked dyspnea and cyanosis. In addition, many infants exhibit marked abdominal distention and diarrhea to a degree more marked than usually seen in pneumococcus pneumonia.

Physical signs in the chest vary markedly with the stage of the disease encountered. There may be no abnormal findings early, but later, typical evidence of consolidation may be found. It is surprising how well breath sounds may be heard through an area of empyema fluid in an infant despite a dull or flat percussion note. When one encounters evidence of pneumonic involvement of an entire lung field in an infant, empyema is usually present. Evidence of frank empyema or tension pneumothorax may be found on the first examination. Thoracentesis when tension pneumothorax is present reveals a gush of air and pus under great positive pressure in cases of staphylococcus pneumonia. The most serious complication encountered is the sudden development of a broncho-pleural fistula from rupture of a lung abscess and development of tension pyopneumothorax with mediastinal flutter and asphyxia. One must remain constantly alert for this complication because if it is not relieved immediately by thoracentesis and the institution of closed drainage, death may result.

The majority of patients exhibit extreme toxemia, prostration, acute distress, pallor or cyanosis, and the appearance of overwhelming infection. The physician is seldom called upon to treat more acutely ill patients. The blood usually reveals a marked polymorphonuclear leucocytosis of 25,000 to 45,000 and a definite shift to the left in the Shilling hemogram. Absence of leucocytosis is a bad prognostic sign. A moderately severe hemolytic anemia develops during the course of the toxemia. Bacteremia occurs in 10 to 38 per cent of cases, the highest incidence is in the younger infants. Recovery of staphylococci from throat cultures is of little help in infants.

The X-ray assists greatly in detecting localizations and pockets of empyema, also in following the course of the disease. In uncomplicated staphylococcus empyema, the X-ray is identical to that seen in empyema due to other organisms. X-ray evidence of spontaneous pyopneumothorax is most characteristic of staphylococcus pneumonia and empyema. A large collection of fluid and air with immobility of the corresponding leaf of the diaphragm and a rather marked displacement of the mediastinum to the opposite side are characteristic findings. If the pyopneumothorax develops late in the disease, the pocket of fluid and air may be rather small because of limiting preformed adhesions. Sometimes several such pockets may be seen arranged in such a manner as to suggest congenital cystic disease of the lung.

The positive diagnosis is usually made by recovering staphylococci from the empyema fluid, lung puncture or from the blood stream. The empyema fluid is often blood tinged. Spontaneous pyopneumothorax in an acutely ill child should suggest staphylococcus pneumonia. Throat cultures may suggest the true etiology by showing great numbers of staphylococci and absence of pneumococci, but this is unreliable. A failure to respond to sulfonamide therapy in adequate dosage indicates that the pneumonia is probably not of pneumococcal origin.

Treatment

Penicillin therapy should be employed in all young infants suffering from pneumonia because of the incidence of staphylococcus pneumonia in patients under one year of age. The fulminating course of the disease in some patients may produce death before empyema becomes clinically evident.

Penicillin should be given in dosage of 1,000 units per kilogram of body weight intramuscularly every three hours; from 10 to 50,000 units every three hours depending upon the size of the child is usually quite adequate. If the patient fails to respond, it should be administered every two hours and the dosage increased as deemed necessary.

Sulfadiazine is not essential for the therapy of staphylococcic pneumonia, and is of questionable value. However, because of the great frequency of mixed bacterial infections in the pneumonias of infancy, it is wise to combine sulfadiazine with penicillin in the routine therapy of pneumonia in infants. In toxic infants who cannot take medication by mouth, sodium sulfadiazine in ½ per cent solution in saline may be given subcutaneously in dosage of one-tenth gram per kilogram of body weight every eight hours. This may be continued until they are able to take the usual dosage of two-tenths of a gram per kilogram per twenty-four hours by mouth.

Staphylococcus antitoxin holds promise in controlling the severe toxemia seen in many cases. However, it has not been widely used because the results from penicillin and surgical drainage have been so gratifying.

General Supportive Measures

General supportive measures are of the greatest importance. Oxygen must be used freely to combat the marked dyspnea, cyanosis and toxemia. Parenteral fluids must be used frequently to relieve dehydration and electrolyte deficiency and provide food in the form of dextrose. Frequent blood and plasma transfusions are necessary in order to combat anemia and protein deficiency. Abdominal distention and adynamic ileus often requires continuous return flow enemas, cold stupes to the abdomen and prostigmine.

Empyema Managment

A constant vigil should be kept for the development of tension pneumothorax, and a thoracentesis set should be kept available at all times. If pneumothorax is not present, daily needle aspirations of the empyema cavity and instillation of 40,000 to 100,000 units of penicillin is the easiest method in very small infants, provided there is a very thin fluid and drainage is adequate. This method entails the constant hazard of a sudden developing tension pneumothorax. Closed intercostal syphon drainage is the method of choice. The procedure is easily and quickly done under local anesthesia by means of a trochar. A No. 20 catheter is introduced into the empyema pocket through the trochar, and the trochar removed. The catheter is then connected to a rubber tube with the distal end under a water seal contained in a bottle on the floor. The procedure is easily withstood by the most toxemic patients, permits adequate drainage and protects against the possibility of development of tension pneumothorax. In the presence of tension pneumothorax, intercostal intubation with closed drainage is imperative in order to re-expand the lung and provide drainage. This is often a life-saving procedure. When needle aspiration affords inadequate drainage, this method should be used. The tube must be kept well opened by irrigation once or twice daily in order to provide good drainage. Irrigation of the empyema cavity with penicillin is of doubtful benefit. Irrigations cannot be carried out in the presence of a broncho-pleural fistula. In my experience with children, all broncho-pleural fistulas have closed spontaneously. Blow bottles or balloons are of some aid in helping re-expand the lung.

As the cavity becomes smaller and the pleural surfaces adherent, the closed drainage system may be converted to open drainage by cutting the catheter one inch from the chest wall. Criteria for conversion to open drainage are: (1) Time; (2) Lack of fluctuation of water level in drainage tube; (3) Small cavity of 30 cc. or less; (4) X-ray findings. Open drainage gives the child greater opportunity to move about and so lightens an otherwise tedious course of treatment.

If the closed drainage system is not working well, the tube may be removed and re-inserted in another rib space without great trauma.

Although the exudate may be thick and fibrinous, mediastinal flutter may accompany open drainage. For this reason rib resection is performed only after intercostal intubation and closed drainage has failed.

SUMMARY

The subject of staphylococcus pneumonia and empyema in children has been presented with emphasis on the severity of the infection and the tender age group attacked. The importance of pyopneumothorax has been pointed out, and a method of therapy with penicillin and surgical drainage was outlined.

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MILK CONSUMPTION AT HIGH LEVEL

More than 60 million quarts of fresh milk and cream are now being used daily by U. S. consumers, a larger amount than at any time before the war, according to new figures developed by the Milk Industry Foundation.

Per capita consumption is 16 per cent above the pre-war level and milk and dairy products are the most widely used foods, comprising more than 25 per cent of all foods consumed by the average American.

Comparative Uses of Pentothal Sodium in Civilian and Military Practice

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Since 1872, when Oré first used chloral hydrate to produce anesthesia by intravenous injection, many agents have been employed experimentally while searching for an ideal agent. In 1932 and 1933 the synthesis of a series of thiobarbiturates stimulated the search for a drug whose action would be more rapid and more transient than that of sodium amytal or pentobarbital sodium (nembutal). The separate investigations of Volwiler and Tabern, and those of Miller, Munch and Crossby brought forth preliminary reports in 1935, announcing that some of the sulphur-containing barbiturates possessed promising pharmacologic properties. It was found that their sedative and hypnotic action produced a natural sleep, free from many of the untoward effects resulting from the use of the oxygen homologues. Because their action was potent and of short duration, clinical studies of the intravenous use of one of these chemicals, namely pentothal sodium were instituted in June, 1934, at the Mayo Clinic. This initiated the use of a drug that has become one of the most popular agents now listed in the anesthetist's armamentarium. A better intravenous drug for the production of surgical anesthesia may be discovered but this thiobarbiturate is the outstanding agent at this time.

Since 1934 much has been learned regarding the actions and use of this drug. Prior to World War II it was realized that the drug was a potent one requiring an intimate knowledge of its pharmacologic and physiologic actions before it could be used safely. It provided a means of induction of anesthesia that was pleasant to patients. The enthusiasm with which pentothal sodium was received together with the eagerness of some individuals to use it for all types of surgical procedures led to many injudicious applications. Nevertheless, those who were most widely experienced in its use realized that just as adequate medical and surgical treatment must depend upon accurate diagnosis and sound therapeutic judgment so must the selection of patients for administration of pentothal. Rapidity of its action together with its depressant effect upon respiration constitute its outstanding characteristics. The depressant effect is directly proportional to the size of the dose administered and the rapidity with which it is administered intravenously. Additional known factors influencing respiratory depression were marked variations in individual tolerance, preliminary medication employed and effectiveness of mechanisms involved in detoxification. Rapid injection causes marked decrease of blood pressure and a reduction in the force of cardiac contractions with concomitant increase in cardiac volume. Dilatation of arterioles, capillaries and venules may improve or further impede circulation depending on the degree of spasm originally existing. Respiratory embarrassment may occur in the presence of cardiac embarrassment thus creating an acute emergency demanding prompt and adequate treatment.

Establishment of a clear airway and administration of oxygen under intermittent positive pressure must be instituted immediately. Undue fatigue of a partially paralyzed respiratory center by administration of carbon dioxide must be avoided. Because the respiratory center is affected before the cardivoscular system, artificial respiration will restore respiratory function if anoxia of the vital centers has not been permitted to occur. A well oxygenated organism will detoxify pentothal sufficiently to permit re-establishment of normal conditions of anesthesia. Evidence led us to believe that the ultra-short action of pentothal sodium was proportional to the rapidity of its detoxification by the liver. The drug is broken down into innocuous degradation products which are excreted by the kidney. Severe hepatic disease contra-indicates the use of this thiobarbiturate even though we may presume that muscle and blood play a part in its destruction. Patients with nephritic involvement should be given this agent cautiously and in minimal doses. Another characteristic pharmacologic action of this drug is its anticonvulsant property. It was known that its administration to patients having convulsions due to tetanus, eclampsia, epilepsy or an overdose of procaine, pontocaine or cocaine was a therapeutic measure with which all physicians should be familiar. It was also known that under certain conditions of irritability laryngospasm and bronchospasm were apt to occur during administration of this agent particularly if secretions collected in the supraglottic space or in the bronchial tree. The administration of atropine preoperatively minimized this hazard but its action was not effective in the presence of hemorrhage occurring in the upper respiratory tract. Asthmatic conditions and bronchial irritation associated with hay fever did not lend themselves well to the administration of pentothal. Because reduction in respiratory excursion is so intimately associated with the administration of pentothal it was realized that the presence of dyspnea, irrespective of cause, contra-indicated the use of pentothal. Although the barbiturates are anticonvulsants they, as a class, are incapable of producing major degrees of muscular relaxation unless excessive doses are employed. Use of pentothal as the single anesthetic agent for abdominal exploration was far from being generally accepted. Progress of the best thought was toward minimization of dosage by employment of adequate sedation preoperatively and the administration of supplementary agents by inhalation. Nitrous oxide and oxygen in equal quantities, when administered during the injection of pentothal, either reduced the dose of pentothal for a given surgical procedure or made it possible to maintain anesthesia longer without exceeding the administration of a given quantity.

The indications for employment of pentothal were fairly well delineated but its limitations were known to too few. It was established that surgical procedures involving the placement of a patient in a position where control of the airway was difficult or impossible contraindicated its use. Exploration of the cerebellum and operations involving the face came in that class. Operations involving the nasal sinuses, mouth, and pharynx were known to be hazardous procedures when pentothal was employed. Incision and drainage of abscesses of the neck, particularly if pressure were exerted in the region of the pharynx, larynx or trachea, were fraught with danger if pentothal were employed. Intrathoracic procedures were not accomplished with that degree of safety inherent in the use of inhalation anesthesia.

Prior to 1942, it was realized that the administration of pentothal sodium should be restricted to those individuals whose training was adequate in maintenance of airway, whose judgment, in the event of untoward effect, was adequate to formulate and carry out remedial measures. A thorough-going knowledge of the signs and symptoms of anesthesia established by intravenous agents was a prime requisite. It is not our intention to outline the signs of anesthesia. Suffice it to say that solutions of pentothal in 2.5 per cent concentration were known to be sufficiently potent for any surgical procedure. Character of respiration was considered the best single guide to evaluation of depth of anesthesia. Corroborative evidence could be gained from observation of the movements of the eyeballs. Pinpoint pupils were known to occur much earlier in the progress of an anesthesia produced by pentothal than by ether. Return to reflex activity did not always occur in the same order during emergence from anesthesia as was exhibited during induction. Pentothal sodium was not an analgesic and did not obtund pain without loss of consciousness. Amnesia covered the time of operation even if the patient muttered during it. The period of amnesia extended beyond the time at which the patient awoke and talked lucidly. The administration of pentothal was so simple, its action so rapid, that physicians were prone to overlook these salient facts. Experienced anesthetists maintained light anesthesia by intermittent doses depending upon amplitude of respiration, increase in muscular tone, movement of eyes, arms and legs as guides to control of dosage. Because of existing amnesia and ease of deepening anesthesia, dosage could be minimized if the extremities are restrained throughout the surgical procedure. By utilizing the proven method of slow induction by slow injection and maintenance by frequent additional injections smooth anesthesia resulted. Periods of alternating deep and light anesthesia, respiratory depression, and anoxia could be avoided, thereby increasing the margin of safety.

Smaller total doses were required by this fractional method of injection, a factor which played an important part in the early recovery of the protective reflexes. The optimal total dosage should not exceed one (1.0) gram (15.5 grains). Utilization of pentothal in larger doses for long operations violated this rule and resulted in loss of the advantages the drug normally offered. Large doses predisposed to prolonged sleep, respiratory depression, anoxia, delayed recovery of protective reflexes and increased incidence of pulmonary complications arising from pulmonary edema. For lengthy operations one should resort to other anesthetic techniques or else employ one of the many types of combined or balanced anesthesia. It was with this information as a background that we entered the World War II. An intimate knowledge of its pharmacologic actions were enough to warn us against its wholesale use.

Probably no group other than those in the Armed Services had a better opportunity to assay the value of pentothal under the most trying conditions of housing, climate, working conditions, equipment and variety of lesions to be treated. The utilization of the agent in wartime surgery varied with the location of the military installation. Wounded soldiers were first seen by Medical Aid Men and given first aid. If they were in pain morphine was administered and then they were carried to a Battalion Aid Station. From there the disabled and the seriously wounded were transferred to a Collecting Station where their wounds were examined and redressed if necessary. From this point they were transferred by ambulance to the Divisional Clearing Station. The nontransportables were diverted to a platoon of a Field Hospital which functioned nearby.

Seriously wounded soldiers whose poor condition and extensive major, frequently multiple, wounds contra-indicated further evacuation to the rear, underwent surgical treatment in these furthest-forward hospitals. Wounds involved the head, face, neck, chest and abdomen singly or in combination. Compound fractures of the extremities were also treated if the patients exhibited major degrees of shock. Under such circumstances the limitations of pentothal were recognized and ether-oxygen administered endotrachially was given first choice. Varying degrees of blood loss, existing or impending shock with its associated anoxia made it essential that these men receive adequate replacement of fluid. Whole blood and plasma were freely available and freely administered prior to operative interference. Oxygen was administered by means of nasal catheter or B.L.B. mask. Excellent preoperative care was given these patients by teams specifically trained in the management of shock.

To avoid the inherent dangers arising from aspiration of foreign material into the bronchial tree, stomach tubes were passed routinely in order to withdraw any remaining gastric contents. This was a very valuable part of the integrated and concentrated preoperative preparation. It not only reduced the incidence of postoperative nausea and vomiting but it served to minimize the possibility of aspirating vomitus during induction and during emergence from anesthesia. Anyone who gave pentothal to a soldier whose stomach had not been emptied, even though it was for induction only, courted disaster. Although the barbiturates are excellent antispasmodics they should not be expected to guarantee induction without retching where the patient's stomach is full. Although a soldier might have been wounded six hours previously, if he had eaten one hour prior to wounding it was to be presumed that his stomach contained formed food unless he had vomited in the meantime. Furthermore, any medical officer who administered pentothal to patients suffering from existing or impending shock, severe blood loss, or any disability which produced a distressing reduction in vital capacity, courted disaster. Where these factors were taken into consideration pentothal was not used for major surgical procedures in Field Hospitals except for induction. The employment for induction was avoided unless it was established that shock, acute hemorrhage, impending acute hemorrhage and other causes of dyspnea were absent.

Preliminary medication was administered intravenously. This consisted of atropine. Because atropine reduces secretory activity of the respiratory tract and lessens the likelihood of reflex vagal activity, its use prior to induction with pentothal is essential. It helps in avoiding pulmonary edema. The combined effects of morphine and atrophine facilitated production of anesthesia with minimal doses of pentothal. Their administration decreased the incidence of coughing, sneezing, hiccoughing and that ever-present, lurking gremlin, laryngospasm. Morphine was given provided that sufficient or too much opiate had not previously been given. Extreme caution was necessary in determining whether or not morphine was needed. Acute hemorrhage, shock and exposure to varying degrees of cold not infrequently resulted in retention of unabsorbed opiate in the blanched tissues. The hazards of delayed onset of respiratory depression due to an overdose making itself manifest during the preoperative or operative period had to be seriously considered. These factors assumed added significance because morphine has somewhat of a synergistic action with pentothal sodium.

Analeptics are mentioned only to be condemned. Coramine, metrazol and other so-called respiratory stimulants produce ultimately additional respiratory depression. This fact became so widely recognized that analeptics are being eliminated from the Table of Supply in the Army Medical Corps.

Because so many anesthetists were relatively inexperienced, knowledge was gained the hard way. In the North African Campaign Auxiliary Surgical teams used pentothal for as high as 90 per cent of patients. Frequently lack of equipment and supplies permitted no alternative. On D-day in Northwest Europe, Field Hospital platoons were equipped with one portable gas machine each. This proved inadequate and in July the Senior Consultant in Anesthesiology recommended increase of this non-expendible equipment to two machines per platoon. The incidence of employment of pentothal as the sole anesthetic agent in these forward hospitals decreased throughout the campaign (Table 1), but the incidence of employment of nitrous-oxide and oxygen as a supplement unfortunately decreased. Reliance upon the use of nitrous-oxide-oxygen-ether administered through an endotracheal tube increased as the skill and experience of anesthetists increased.

Table 1
Incidence of Employment of Pentothal Sodium in Field Hospital, E. T. O.

E. T. O.	1 June to 31 Oct. '44	1 Nov. to 31 Dec. '44	1 Jan. to 31 May '45
	Percent	Percent	Percent
I. V. Alone	22.05	24.27	14.58
I. V. Combined	11.51	5.08	4.03
Total	33.56	29.35	18.61

Percentages are in terms of total number of all anesthetics administered and reported in each period.

The next medical installation in the chain of evacuations was the Evacuation Hospital, a semi-mobile unit of 400 beds. The recently wounded patients received were the transportables whose surgical lesions did not receive treatment until they had reached this echelon. Medical officers responsible for triage at the Divisional Clearing Station had decided that wounds and general condition were such that they could safely be transported five to ten miles by ambulance.

Surgical intervention in these hospitals included neurosurgical and maxillo-facial procedures, occasionally abdomino-thoracic or combined thoraco-abdominal procedures, numerous debridements and a great volume of orthopedic procedures. There were times, however, when Army policy, the tactical situation, or the terrain made it necessary to locate Evacuation Hospitals in the most forward positions. Under these circumstances they received non-transportables as well as the less seriously wounded directly from the front. Neuro-surgical procedures were frequently done under local anesthesia and pentothal sodium was used as a supplement in many instances. It was important that increased venous pressure and anoxia caused by respiratory obstruction be avoided at all times. For this reason endotracheal anesthesia with pentothal used as a supplement was commonly employed. Maintenance of an efficient airway during maxillo-facial procedures made endotracheal anesthesia mandatory and provided surgeons with a clear operative field. Following induction with pentothal sodium an endotracheal tube was inserted. Maintenance of anesthesia was provided by inhalation of nitrous-oxide and oxygen with some ether added or with pentothal sodium used as a supplement. In the presence of impending respiratory obstruction induction with pentothal sodium was avoided and topical anesthesia was employed prior to insertion of the endotracheal tube. In the presence of massive wounding of the face and neck establishment of a tracheal stoma was imperative and the anesthetic was administered by inhalation through it. Surgical intervention within the cervical region contra-indicated the use of intravenous anesthesia unless an endotracheal tube was in place permitting the maintenance of an airway and administration of anesthetic agents by inhalation. For abdominal and combined thoraco-abdominal procedures, endotracheal ether and oxygen was employed. Pentothal was used as an agent for induction provided that contraindications to its employment were non-existent. Orthopedic and minor surgical procedures, such as debridement, gave pentothal its most extensive field of usefulness. It is interesting and instructive to note that as the campaign of Northwestern

Europe progressed the employment of pentothal alone decreased and the percentage of patients receiving pentothal with supplementary inhalation anesthesia increased. Nitrous-oxide and oxygen in equal proportions, or with a preponderance of oxygen to offset the volume utilized to maintain metabolic functions, constituted the most common combination employed with intravenous anesthesia. That balanced anesthesia was used frequently is a tribute to the greater care exercised by surgeons and anesthetists in the selection of anesthetic agents employed.

The greatest number of wounded patients who received pentothal sodium for their operative procedures were treated at the level of the Evacuation Hospital. Statements of several anesthetists who served with these hospitals are indicative of the value of pentothal sodium and reflect the caution and respect with which these medical officers employed this potent agent. An anesthetist assigned to an Evacuation Hospital that followed our forces through Normandy, France and into Germany stated that "during the first days of the campaign the shortage of trained anesthetists necessitated the use of pentothal sodium in a larger percentage of cases than would now be considered advisable." "It is our firm opinion," he added, "that pentothal sodium should not be discarded completely but that it should be used with discretion in selected cases alone, or preferably combined with nitrous-oxide and oxygen 50 per cent of each." Another anesthetist assigned at this level in the chain of evacuation wrote as follows: "the introduction of this drug on a wide scale was an outstanding contribution to the speed with which our casualties were treated surgically and were evacuated to the rear. It is extremely simple to use and with proper precautions very safe." A third anesthetist reported that in the hands of competent individuals particularly those well versed in endotracheal intubation pentothal sodium can be used even more widely than it is at present. A fourth anesthetist who was in an Evacuation Hospital recorded this opinion: "Sodium pentothal has perhaps been given, when it should not have been, more frequently than any other anesthetic agent. Patients whose wounds appeared minor but proved to be major were given pentothal resulting in serious consequences." An anesthetist with an Auxiliary Surgical Group who served in Africa, Italy and ultimately in France and Germany had this to say about the use of pentothal by untrained personnel: "Pentothal was used extensively (throughout the theatre) by a great variety of persons totally untrained and unqualified. It is not surprising to me, therefore, that a few fatalities did take place. However, I resent any all-inclusive indictment of the drug itself without consideration of the other factors encountered in its use for war-time surgery." In order to evaluate these conflicting opinions it would be necessary to know the training, experience and assignments of the men who expressed them. Nevertheless, they do indicate the real respect in which the drug was held. Table 2 indicates the trend in employment of pentothal sodium in Evacuation Hospitals.

In Transit, Station and General Hospitals, far removed from the front, employment of pentothal sodium was used in much the same manner as it is used in civilian hospitals. Here again the clinical fact was recognized that the amount of pentothal sodium required could be greatly reduced if nitrous-oxide and oxygen in equal proportions were given by inhalation during administration of the drug intravenously. In Field and Station Hospitals functioning as Holding Hospitals at air strips or ports two opposing features in the use of pentothal sodium came to light. The speed with which patients could be evacuated after operation was greatly increased if this agent were used. The second fact observed was not due to pentothal itself but to the use of scopolamine for medication prior to its use. Delirium and disorienta-

TABLE 2

Incidence of Employment of Pentothal Sodium in Evacuation Hospitals, E. T. O.

E. T. O.	1 June to 31 Oct. '44 Percent	1 Nov. to 31 Dec. '44 Percent	1 Jan. to 31 May '45 Percent
I. V. Alone	52.50	45.40	35.78
I. V. Combined	5.59	8.14	8.57
Total	58.09	53.54	44.35

Percentages are in terms of total number of all anesthetics administered and reported in each period.

TABLE 3

Incidence of Employment of Pentothal Sodium in Station Hospitals, E. T. O.

E. T. O.	1 June to 31 Oct. '44 Percent	1 Nov. to 31 Dec. '44 Percent	1 Jan. to 31 May '45 Percent
I. V. Alone	33.18	27.18	21.80
I. V. Combined	10.07	13.73	14.77
Total	43.25	40.91	36.57

Percentages are in terms of total number of all anesthetics administered and reported in each period.

TABLE 4

Incidence of Employment of Pentothal Sodium in General Hospitals, E. T. O.

E. T. O.	1 June to 31 Oct. '44 Percent	1 Nov. to 31 Dec. '44 Percent	1 Jan. to 31 May '45 Percent
I. V. Alone	37.60	37.60	30.77
I. V. Combined	13.60	19.20	22.70
Total	51.20	56.80	53.47

Percentages are in terms of total number of all anesthetics administered and reported in each period.

TABLE 5

Incidence of Employment of Pentothal Sodium in All Military Hospitals

E. T. O.	1 June to 31 Oct. '44 Percent	1 Nov. to 31 Dec. '44 Percent	1 Jan. to 31 May '45 Percent
I. V. Alone	39.50	37.82	30.71
I. V. Combined	11.33	14.59	17.14
Total	50.83	52.41	47.85

Percentages are in terms of total number of all anesthetics administered and reported in each period.

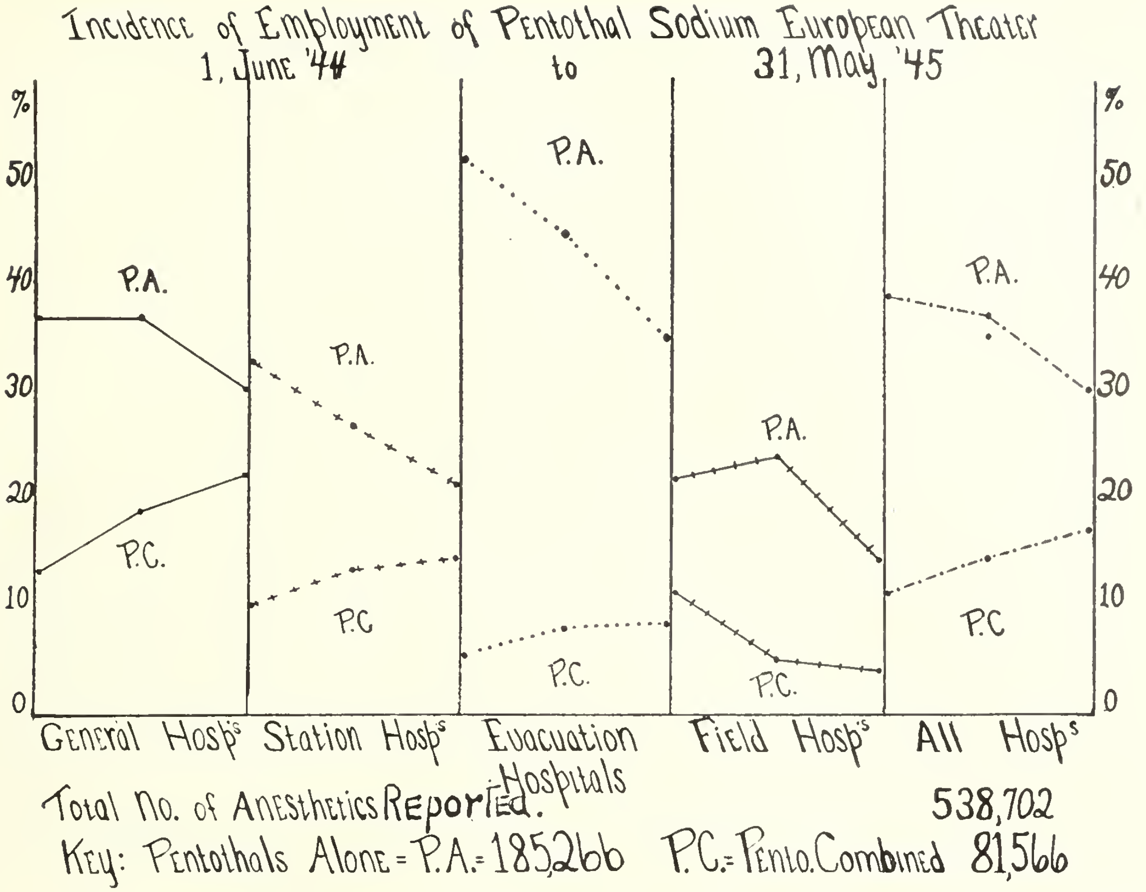

Figure 1.

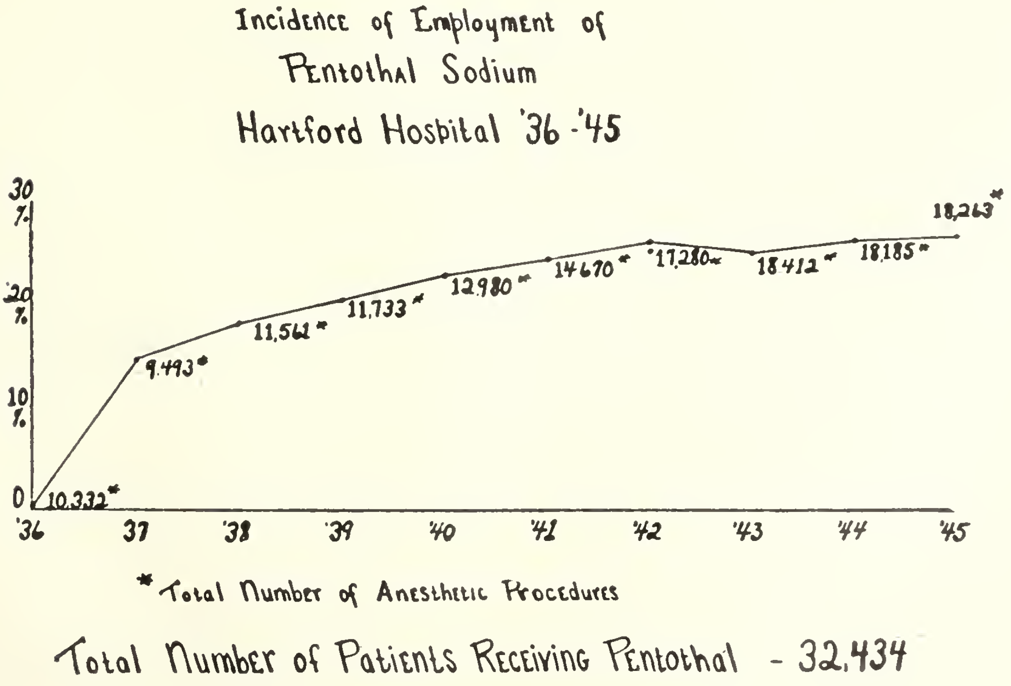

Figure 2. Expressed in Percentages.

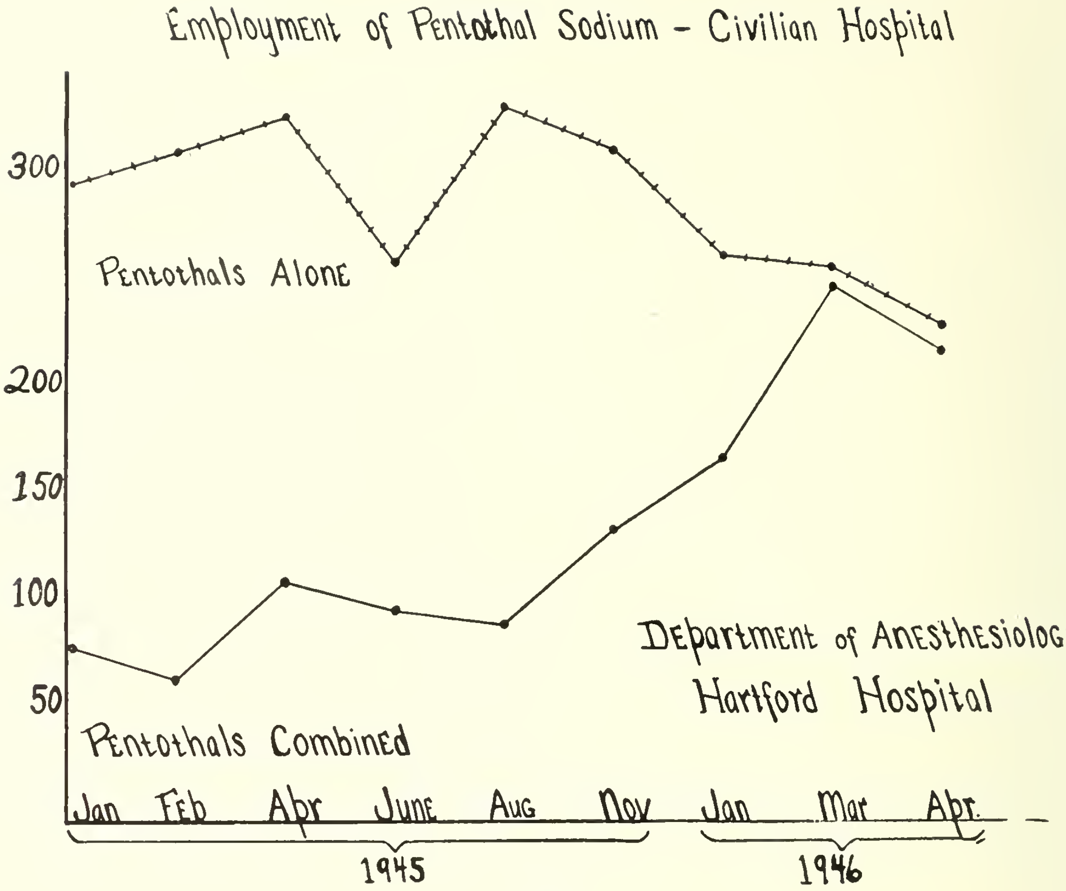

Figure 3.

tion manifested by patients who had received scopolamine followed by pentothal sodium complicated the evacuation and require constant observation by corpsmen and nurses who were greatly needed elsewhere. The employment of minimal doses of pentothal for the production of amnesia had a great field of usefulness in prognosis and treatment of neuro-psychiatric disorders. The incidence and trend in incidence of employment of this agent throughout the European campaign is indicated in Tables 3, 4 and 5. Figure 1 is a composite graph of information contained in Tables 1, 2, 3, 4, 5.

Trends in the employment of pentothal in a representative, large, civilian hospital over a period of ten years are indicated in Figure 2. Since the Department of Anesthesia was reorganized in 1936, the popularity of the drug has steadily grown. Unfortunately, analysis of the data throughout the years was not made on the basis of pentothal used as the sole agent compared with the frequency of its employment in combined anesthesia. Figure 3 indicates that recent trends have been influenced by the return of anesthetists who had an extensive experience in the Armed Services. In recent months there has occurred a marked change in the incidence of employment of pentothal alone compared to its employment in combination with other agents. Prior to termination of World War II, shortage of personnel forced the employment of single agents and methods but, since October 1945, with the addition of 12 residents practically all of whom are experienced military anesthetists a more striking change in employment of pentothal has occurred than was seen during the eleven months' campaign in Europe. The change reflects the growing popularity of "pentothal combined." Early enthusiasms of civilian and military anesthetists have been tempered by experience. Sound principles have been formulated for the proper use of pentothal. It is firmly believed that pentothal as the sole agent may be employed for short operative procedures that do not require complete muscular relaxation whereas pentothal combined with other agents may be used for procedures of longer duration. In every instance, the contra-indications, known to some prior to World War II and to many since the conflict, should be thoroughly recognized as important and they should be heeded. It would be rash to predict that pentothal has reached the peak of its popularity. It is possible that muscular relaxation may, in future, be safely produced by combinations of agents administered intravenously. Curare has been given limited trial and other agents may be offered by the pharmacologists.

In conclusion, it may be said that pentothal sodium has offered much in civilian practice. It controlled the pain of thousands of Allied soldiers. It made rapid treatment and rapid evacuation possible. Specific contra-indications to its employment are known. It must be realized that it is a potent agent, administration of which, by the uninitiated, is hazardous. Because it is given intravenously and because its action is rapid patients have no natural protective mechanism to combat overdosage. In this regard it differs from ether because, with this irritating volatile agent, patients can struggle, hold their breath, cough or vomit. During maintenance with open ether decrease in respiratory volume constitutes a safety factor guarding against overdose. Lack of such a safety factor is inherent in the method of administration of pentothal. Oxygen under controlled, intermittent positive pressure should always be available when this potent agent is used. Delegation of the administration of pentothal to the unskilled should never be tolerated. The patient's safety depends solely upon the judgment of the administrator.

Book Reviews

Pharmacology, Therapeutics and Prescription Writing. Walter A. Bastedo, M.D. New 5th edition. 1947. 840 pages; illustrated. Philadelphia: W. B. Saunders Company. Price $8.50.

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The author of this text deals in terms of clinical medicine and practical therapeutics. With the introduction of so many new drugs and therapies, the physician will undoubtedly refer more and more often to a good reference on pharmacology such as this volume. There is no long discussion of experimental and controversial data, and each drug is listed with a summary, active constituents, solubilities and incompatabilities, various preparations (with dosage and strength), method of action, manner of prescription, contraindications and toxicity.

Among the new material are treatises on radioactive iodine, rutin, BAL, thiouracil, penicillin, streptomycin, folic acid, the coagulants (including fibrin foam, etc.), and the latest data on the hormones and their uses.

The final section of the book is devoted to an unusually informative monograph on prescription writing. J. N.

The Principles and Practice of Medicine. Henry A. Christian, M.D. D. Appleton-Century Co., New York, London. 16th edition; 1539 pages. Price $10.00.

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This new edition is appropriate as to new materials, new therapeutics and timely revision following the recent advances in chemotherapy, and discoveries in the field of tropical and infectious diseases. The balanced and conservative attitude of Osler has been preserved and applied to the new subjects. A notable contribution is the chapter by James G. Carr on the History of Medicine as told in the 16th edition of Osler's *Principles and Practice.*

This sixteenth edition may well replace its predecessors on the shelves of students, general practitioners and specialists. J. C.

The American Illustrated Medical Dictionary. 21st edition. W. A. Newman Dorland, M.D., F.A.C.S. 1660 pages; 880 illustrations including 233 portraits. In collaboration with E. C. L. Miller, M.D. Philadelphia & London: W. B. Saunders Company, 1947. Price: $8 without thumb index; $8.50 with thumb index.

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This newest edition of the Dorland volume includes some 2000 new words which have been added. These new terms are now found in the fields of tropical medicine, aviation medicine, medical zoology and mycology, biochemistry and pharmacology —including antibiotics, enzymes, vitamins and endocrines—and include medical applications of radioactive isotopes of the chemical elements. The publishers have scrutinized the entire volume line by line in the interests of factual and typographic accuracy.

Long favored among physicians, educators, students, authors, editors, etc., for its completeness, authority and responsive qualities, the 21st edition of the *American Medical Dictionary* continues to be a one-volume encyclopedia of things medical. J. N.

Essentials of Pharmacology. F. K. Oldham, F. E. Kelsey and E. M. K. Geiling, all of the University of Chicago. 1947. 440 pages with index. Philadelphia: J. B. Lippincott Company. Price $5.00.

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The authors' stated purpose was to present the essentials of pharmacology briefly and concisely as an introduction to the subject. The book should be useful as an elementary text for medical students, dentists, nurses, pharmacists, veterinarians, perhaps social workers and hospital administrators. General principles of pharmacology are elucidated, and control and regulation with methods for prescribing and administering are explained. English names are used for drugs, and metric dosage is given. Official pharmacopeiae preparations and some new and non-official remedies are listed. Main structural chemical formulae are diagrammed, and simple schema illustrating drug actions are charted. Drugs are classified as functional and chemotherapeutic. Endocrine substitutes and vitamin supplements are included, with functional substances.

References corroborating and expanding important matters briefed in the text are to recent, accessible and authoritative articles. The index is adequate. J. C.

Penicillin in Syphilis, by Joseph Earle Moore, M.D., Associate Professor of Medicine and Adjunct Professor of Public Health Administration, The Johns Hopkins University; Physician-in-charge Syphilis Division of the Medical Clinic and Visiting Physician, The Johns Hopkins Hospital; Chairman, Syphilis Study Section, National Institute of Health, United States Public Health Service; Chairman, Subcommittee on Venereal Diseases, National Research Council. Pp. 284 with 58 figures and 52 tables. Springfield, Illinois: Charles C. Thomas, 1946; $5.00.

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This book is an excellent compilation of the vast amount of material available on penicillin in syphilis, written and interpreted in a lucid and organized style by an outstanding authority.

The author presents the problem in the preface, stating that the monograph is an effort to supplement the deficiency in current knowledge of how best to employ penicillin in the various stages of syphilis. He introduces a chapter on the chemistry of penicillin which is worth reading by anyone using the drug for any purpose. Following this the pharmacology of penicillin is considered. To the practitioner concerned over the reports of ineffectual penicillin, the author dwells at length on the active species of penicillin, and makes especially clear the unusual time-dose relationship of this drug compared to other anti-luetic medications.

Penicillin-fastness is given consideration, followed by an excellent chapter on the use of the drug in experimental syphilis. The author devotes individual chapters to the use of penicillin in the various stages of syphilis. He has drawn freely and accurately from the literature, but includes as well an unusual amount of his own published and unpublished experience.

The reader need not feel that this recognized authority overly complicates the problems. Before each subject, space is devoted to a common-sense statement of what is known to date, and, consequently, a considerable amount of practical syphilology is included in the volume. An extensive list of references follows each chapter.

It is a pleasure to read a monograph written in such clear style. The book should prove of great interest to all physicians using penicillin, and especially to those who are responsible for the treatment of syphilis. J. H.

Masochism in the Medical Patient*

Alan Challman, M.D.
Minneapolis, Minnesota

THE wise doctor learns from sad experience, if not from his professional preparation, that his patients do not always consult him out of a desire to prolong their lives or diminish their suffering. The medical man must often combat more than the destructiveness of bacteria, viruses, toxins, new growths and the ravages of time. The self-destructive or self-punitive urge may be active in any patient no matter what disease is under treatment. I would like to present to you, briefly, three cases in which the self-destructive urge was clearly demonstrable.

CASE HISTORIES

Case 1. Mrs. A., a 35-year-old housewife with four children, was referred by a dermatologist because of a neurotic excoriation of the skin. There were several slowly healing pits on her forehead and a long serpiginous line of scar tissue extending down her left cheek and across her chin. She was unable to explain why she picked at her skin with her fingernail but she had a long story of marital difficulty to recount.

At age 21, as a recent graduate of an excellent eastern girls' school, she had gone "slumming" with a girl friend and had met a man in whom she immediately became interested, in spite of the fact that she knew that he had spent several years in a penitentiary for robbery. Shortly thereafter, she began to live with him and when she found she was pregnant, asked him to marry her, but he refused. She told her parents, however, that they were married and he agreed to this deception.

At the time of consultation, they had been living together for fifteen years and had four children without benefit of a legal or church marriage, in spite of the fact that the patient was a deeply religious woman. The patient's entire marital life had been made miserable by her "husband's" continuous jealousy. In spite of this, however, after twelve years of "married" life, she arranged for and accepted the invitation of one of her "husband's" friends and went to dinner with him while her "husband" was out of town.

At dinner, she took, for reasons unknown to herself, several tablets of phenobarbital and immediately informed her escort of her action. He attempted to get her to empty her stomach and escorted her to a nearby hotel where he obtained a room for that purpose. His efforts were reasonably successful, but when the patient returned home shortly before midnight she was staggering and gave the impression of being intoxicated.

The "husband" learned something of this incident on his return home in a few days and after that time caused her to live in what she describes as a "perfect hell." It was a nightly occurrence for the "husband" to put the patient through a "third-degree" interrogation of every detail of her association with his former friend. He continued to insist that she must have had sex relations with the man until she finally falsely admitted that she had done so. He was not satisfied with this and after several more months of cross-examination obtained her admission of sex relations on two occasions. At the time the patient consulted me, he was attempting to get her to admit a third occasion.

These sessions, which occurred each night as soon as the children had gone to bed, were so unpleasant to the patient that she became nauseated when the "husband" entered the front door at night. Occasionally, she vomited at the sight of him, knowing with disgust what he was going to do to her. In spite of all this suffering, and in spite of the fact that there was no marriage, the patient continued to live with the "husband" and became more deeply in disgrace as her story included more objectionable material.

She asked me, "Why don't I leave him? All my friends know how cruel he is and tell me I am a fool to put up with it." This patient had made several suicidal gestures or attempts, but had done nothing else to improve her situation. She felt her reaction was abnormal in some way but could not say how. She was certain that she did not desire such a miserable life.

She asked for help, however, in understanding a peculiar reaction on her part which she had noted, i. e., although in the first twelve years of "married" life she had experienced sexual orgasm on only four occasions, since her escapade had led to gross persecution by the "husband," she had felt not only strongly attracted to him sexually, but almost invariably reached an orgasm in their relations. As she put it, "I don't understand why I can't keep my hands off the man even while he's berating me so cruelly. I seem to want to go to bed with him right in the middle of one of those barbaric sessions."

In this patient, we see the self-destructive urge manifested in the excoriation of her skin; her long association with an ex-criminal far beneath her socially even though he would not marry her; her acceptance of his ungrounded suspicions for many years; her incitement of his suspicions by being detected in going out with his friend during his absence; her submission to his cruel interrogation, accusation, and vituperation; her further incitement of his suspicions by falsely admitting more than she was guilty of; her many suicidal attempts; and, finally, her continuing to live with him in spite of his cruelty although members of her own family were able and willing to support her. In association with the self-destructive urge, we see an erotic component manifesting itself in the patient's increased sexual desire and the disappearance of her frigidity under the lash of her "husband's" cruel method of interrogation.

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*Inaugural thesis, presented at the Minneapolis Academy of Medicine, December 16, 1946.

Case 2. Miss B. was a 24-year-old professional woman, exquisitely dressed, attractive in appearance, and with a very pleasant personality. She was referred by an internist because of functional gastro-intestinal complaints and marked fatigue. She gave the history of having recently been jilted by a young professional man with whom she had been in love for eighteen months. He was married when she met him but was not living with his wife, and had told her that he was in the process of getting a divorce. He was especially kind to her until the last few months of their relationship, although the patient said that she had had a premonition from the beginning that he would not marry her. Sexual intimacies began after a few months of acquaintanceship. He made one excuse after another for being unable to complete arrangements for his divorce and the patient said that during the last year she knew him she spent most of her time crying. The week before his divorce came up for a court hearing, he telephoned the patient and bruskly informed her that he had fallen in love with another girl and was going to marry her. Adding insult to injury, he asked if she would loan him $250.00 to purchase engagement and wedding rings for his new fiancée.

The patient was naturally greatly upset over this turn of events and made a suicidal attempt with a poison. She came to me asking if there were not something wrong with her which could have provoked this rejection on the part of the lover. In support of this question, she stated that this was the third occasion when she had been abandoned practically at the altar by men to whom she was engaged. She had suffered intensely and for a prolonged period after each of these occasions.

In recogntiion of the serious personality disturbance which this patient showed, I felt that psychoanalysis was indicated, but in view of the fact that she did not live in the city and was unable to keep regular appointments, it was agreed that such a procedure was impracticable and that psychotherapy with a continuous supervision of her love life would be attempted instead. The patient was instructed to keep me informed of the development of any new love interest in order that I might appraise the individual concerned. I felt this was necessary since the last two men who had jilted her were definite psychopathic personalities of the "confidence man" type, although holding positions of respect in society. It seemed likely that she would repeat in this choice of a love object if she were without supervision.

The patient was seen at approximately weekly intervals over a period of about three months but suddenly failed to keep an appointment. Five days later she turned up again with a story of another seduction and abandonment. She had met a traveling man at the hotel where she was living and after four or five days of acquaintanceship had agreed to accompany him on a one-day trip to another town.

On this trip he proposed marriage and the patient finally agreed. After overcoming many difficulties in obtaining an immediate license, the marriage still did not occur since the man stated that he was a Roman Catholic and would be married only by a priest. The patient was willing to change her religious faith, but on talking with a priest learned that she would have to receive special instruction for several days before the marriage could be performed.

The couple kept traveling, however, in the interest of the man's business, but each night occupied separate rooms and were not sexually intimate due to the patient's refusal. The man proposed that it would be simpler to be married in Minneapolis but felt they should call on the patient's family who lived a short distance from the latter city, since they planned to make their home in the East after they were married. He therefore called the patient's family by long-distance telephone and informed them that he and the patient were married and that they would be along to visit the family the next day.

The patient agreed to this plan and on arrival at home her family gave a small dinner party for what they supposed to be the newly married couple. She also accepted the congratulations of her professional confreres whom she went out of her way to meet while at home. Her family put them up in a bedroom, which led to the first sexual intimacy between the couple. The next day, the man left the patient in Minneapolis to make arrangements for the wedding while he transacted business in nearby cities, but of course he did not return as he had promised.

This patient was able thus, by a sudden departure from her previous pattern, to frustrate plans to protect her even though she was under close supervision. Contrary to what this story might imply, she is a highly intelligent girl who exercises good judgment in all matters except in her love relationships.

In Miss B. we see the self-destructive urge manifested in her repeated selection of an unreliable psychopathic type as a love object, her willingness to be seduced in spite of her intuitive knowledge that she would be forsaken, her prolonged grieving after each rejection with no attempt to escape from her grief except through suicide, and her successful frustration of efforts to protect her from the fate she feared. The associated erotic component is revealed in the sexual intimacies which she has had only with these men who, she suspects, will forsake her.

Case 3. Mr. C. was a 38-year-old successful businessman who was referred by a general practitioner because of a severe emotional upset in connection with his recent divorce. He had met his wife six years previously when she was 16 years of age. They had met at a bar and had immediately fallen in love with each other. He soon learned that the girl was an adolescent delinquent and he was warned several times by the police to keep away from her. She persisted in coming to his apartment, however, and he found it impossible to turn her away. He pleaded with her to keep away from him, saying, "If you don't, you'll break my heart someday."

As the girl could not be controlled by her mother and stayed away from home overnight frequently, she was finally brought into juvenile court and sentenced to a girls' correctional institution as a sexual delinquent. Mr. C. was also charged with contributing to juvenile delinquency and was given a suspended sentence on the condition that he would not see the girl again. After spending a year in the reform school, the girl immediately got in touch with Mr. C. and their relationship began again where it had left off.

When she was 20 years old they married. It was the patient's second marriage and, though he realized it didn't have a good chance of success, he gave as his reason for it, "She was the only girl I could get a kick out of." The patient made a lot of money on war contracts and lavished every attention upon his young wife, but within a few weeks of their marriage she began to leave him in the evening on one pretext or another and would not return until three or four o'clock in the morning, when she would come in drunk. On many occasions, she stayed away for several days without letting him know where she was.

After a year of this, the patient employed detectives to follow her, but she was always able to evade them. He could not find out exactly what she was doing after she spent the earlier part of the evening drinking in bars in a poor section of town. When she was at home, she would be sweet and loving, but would disappear at any time without warning. When she was away from home for several days, she would usually give the explanation of having stayed with girl friends, but on several occasions when he checked with her friends he found that they had not seen her.

He tried diligently to impregnate her, thinking that a baby might keep her at home, but was unsuccessful in this and accepted the responsibility for the failure in spite of knowing her past history of promiscuity. The marriage seemed doomed but in a last effort to hold his wife, Mr. C. bought a $35,000.00 home which she seemed to want very badly. She remained interested in the new home for only two weeks, then began to chase around again. He thought he would frighten her by threatening divorce and actually filed a complaint. This had no effect on his wife's behavior and at the last minute, when he attempted to stop the proceedings, he found things had gone too far and the divorce was granted.

After three days of searching for his wife, following the divorce, he located her at the apartment of a girl friend and pleaded with her to re-marry him, but she refused; whereupon the patient took several phenobarbital tablets in a suicidal gesture and announced to his ex-wife what he had done. When seen later in consultation, he was still anxious to reinstate his marriage, although he was not hopeful of changing his wife's pattern of behavior.

In Mr. C we find the self-destructive urge manifested by his choice of an unreliable psychopathic mate even though he had the premonition that she would someday break his heart; by his lavish expenditures on her, which, although he was earning big money during the war boom, he could ill afford; by his refusal to give her up even though she made him suffer almost constantly by her unaccountable running away; by his desire to reinstate the marriage after divorce although he knew there could be no reformation; and, finally, by his suicidal gesture or attempt. The associated erotic component is revealed in his statement, "She is the only girl I can get a kick out of."

INCIDENCE

The three cases cited above all show a surprising state of affairs. There appears to be, in each case, an enemy within the gates of the city, evidently holding office of some authority. Whereas, usually the physician and patient are full allies and conspire to overwhelm the unwelcome invader, here we find the patient only partially loyal in the attack or actually a traitor, giving aid and comfort to the enemy. These patients acted as though they had a self-destructive urge; as though the suffering were no wholly unwelcome to them.

If we look around us we find that such cases are not as exceptional as we would like to think. We find evidence that the self-destructive urge is wide-spread in humanity. The frequency of suicide alone will show this. In the United States, there is an outright suicide committed on the average of every twenty minutes.[8] We are also aware of many who volunteered for military service and could not be content until they were transferred overseas and assigned to positions at the front. There is also abundant evidence of the frequency of self-inflicted wounds and intentionally incurred disease in military forces.

In addition, we find many individuals who are "accident prone." They have frequent accidents ranging from those with minor consequences to those which are fatal. A study of such cases indicates that they unconsciously contribute in material ways to the bad luck which befalls them repeatedly.[2] We also see a large number of alcoholics and drug addicts who are slowly but surely bringing about their own destruction through the use of these poisons in spite of good prospects and the unstinted aid of family members and friends in providing opportunity for reformation.[8]

The world has known throughout its history of ascetics who mortify the flesh, usually in the cause of some religious belief, and who willingly suffer untold misery through self-denial. The early Christian martyrs are well-known to have welcomed death without making the slightest effort to save themselves. In this country, we have the Flagellantes sect in New Mexico and Colorado, who, every year at Easter time, make a pilgrimage up the mountainside while they beat themselves and each other with switches, and finally select one of their group for the highest honor of being nailed to the cross. Hindu martyrs also subject their bodies to severe torture.[8]

It is not an infrequent experience in a county attorney's office to find criminals who give themselves up, confessing crimes for which they could not have been apprehended, or who leave tell-tale clues at the time the crime is committed to ensure their detection. Many of these individuals admit that they feel more comfortable in prison where their liberty is restricted than they feel in ordinary society.

War is probably the equivalent of masochism as it applies to society as a whole. In spite of the horrible advance in death-dealing technics, such as biological warfare, chemical warfare, and the atom bomb, society shows great reluctance to put aside war as an instrument to settle disputes. All of these evidences make the conclusion very probable that people *elect* misfortune, misery, punishment, and disease. It must be emphasized that the above are clear-cut examples of the self-destructive urge found in people who are not insane.

In view of the abundance of such clear-cut evidence, we have the right to suspect a self-destructive trend in less obvious form in all those patients who do not cooperate satisfactorily with the physician. Physicians may increase their therapeutic and diagnostic acumen by recognizing such cases for what they are, instead of being puzzled, baffled, indignant, and condemning in their attitudes. There is always a tendency to condemn or dismiss as unworthy of attention that which we do not understand, but a self-destructive urge is too important a matter to be dismissed lightly, for it may become a fatal illness.

The efficacy of bitter medicine over the more pleasant tasting varieties will provide a hint of the patient's need for punishment or displeasure. It is probably for the same reason that blood-letting was considered so useful in an earlier day. We find a hint that an unconscious intention is present in many illnesses in the patient's statement, "I brought it on myself." We also hear the statement, "I caught a cold," but we never hear, "The cold caught me." Every doctor commonly sees cases of obesity and thinness where the love life of the individual is being sabotaged, and yet the patient is unable to follow a proper diet. We also see cases of acne suffering from irritating self-treatments, neglect, or poor cooperation with the therapist, yet who are miserable because of their obvious affliction. Neurotic excoriations of the skin also fall into this category. Self-destructiveness may be suspected in diabetics who do not follow their diets, when one finds poor cooperation in tuberculosis, cardiac disease, gastric ulcer, or when there is a refusal of a necessary operation. Jelliffe has shown that there is a high frequency of sadistic, hostile desires in arthritics. These desires may possibly be frustrated or prevented from coming to fruition by reason of the pain, weakness, and loss of motion which are a part of the disease. The refusal of live-saving surgery and the postponement of necessary medical attention until it is too late are further examples of behavior which should cause the wise physician to suspect a self-destructive trend in his patient.

TYPES

We are dealing here with masochism, which may be defined as a more or less unconscious drive on the patient's part to punish, injure, humiliate, or destroy himself. In a word, it means self-sabotage. This drive is frequently associated with erotic pleasure.[1,3,5,6,8] Masochism appears in several forms which are theoretically distinguishable but which blend into one another in the actual clinical material which we see.

(a) *Normal Feminine Masochism.*[1] This is typically illustrated by the self-sacrificing and long-suffering mother who "works herself to death," takes the clothes "off her back," and denies herself all pleasure "for the sake of" her children. Usually she lets the family know that she is suffering and how weary she is. Her illnesses are generally attributed to over-work or worry over the children. Her health has frequently "never been the same" after the children's births. In some cases, the husband bears a large share of the blame for the mother's suffering and misery. These women turn a deaf ear to the children's pleading to "take it easy." Nothing can turn them from their chosen path of self-sacrifice. They frequently travel to the doctor's office regularly, not so much to get help as to turn a recurrent spotlight on the consequences of their sacrifice of health. They desire no worldly fame but shine in the reflected glory of their families.

(b) *Moral Masochism.* Freud pointed out that certain individuals appear to seek humiliation and failure.[5] In such cases, the masochistic element is more severe than in the feminine type mentioned above.[1] Instead of desiring to be physically beaten or made ill, individuals suffering from moral masochism arrange for fate or destiny to bring about their downfall. They lose their jobs, have repeated accidents or illnesses, pick the wrong mate, make a home for the sadistic mother-in-law, lose their money or valuables, forget to carry fire insurance, and the like. The three cases cited in the earlier portion of this paper are illustrative of the clinical picture of moral masochism. Usually there is an accusing or blackmailing tone to the condition, implying, if not stating, "Look how miserable you've made me," or "They'll be sorry when they see me dead, or a failure, on their account."[3] Such accusations are most explicit in those Japanese suicides which are committed on the doorstep of the person responsible for the subject's undoing.

(c) *Perverse Masochism.* This is a type of sexual perversion in which the individual employs others to flog or insult him, urinate or defecate on him, etc., until a sexual orgasm is produced.[3] This extreme form of masochism is relatively rare in our culture, though better known to prostitutes than to physicians.

CAUSES

What theories have been advanced to explain this enigma in which nature appears to turn against itself? The common, off-hand explanations that the average man of the street gives for such behavior are that the misfortune befell the subject purely through chance, bad luck, foolishness, poor judgment, or because he is mentally deranged. However, close study will show that the so-called misfortunes are too consistent, too much in a pattern, and too repetitive to be a matter of chance or bad luck. The explanation that we are dealing with mere foolishness or poor judgment on the part of the individual is refuted by the observation that many of such cases show intelligence, judgment, and wisdom in the major part of their lives. By dismissing such cases as "crazy" or "mental," one has accomplished nothing constructive and, furthermore, such cases as have been discussed in this paper are not in any instance insane. One must go deeper than chance, folly, or insanity to explain masochistic behavior.

Until 1922, the psychoanalytic theory, which is still supported by quite a few psychoanalysts in spite of Freud's later conclusion, was that masochism arises secondarily as a result of the turning inward of a primary destructive or sadistic tendency. Fenichel[3] is a representative of this school of thought. He believed that sadistic or destructive tendencies appear first as a normal phenomenon in the personality and are utilized possibly as aggression in removing obstacles in the path of gratification for the erotic instinct. These sadistic impulses may later be turned inward against the ego as a consequence of being blocked by fear and guilt. According to this school, self-punishment has the value of relieving guilt. One sees the relation of self-punishment to guilt in religious observances, such as the period of Lent and the Day of Atonement in which self-sacrifice leads to purification and relief of guilt. This tendency is amusingly seen in the little child who may slap his hand before engaging in some wrong-doing in order to thoroughly enjoy the activity without fear of consequences. Fenichel further points out that in masochism:[3]

(a) Suffering appears to be prerequisite for sexual pleasure as though it were a necessary price to avoid guilt feelings. This factor can be seen in the cases of Mrs. A. and Mr. C. cited previously.

(b) Suffering is sought as a sacrifice to appease the gods at a relatively small cost. It is a "lesser evil" to sacrifice the part in order to save the whole.

(c) A limited amount of torture under self-controlled conditions may be sought by the individual as a reassurance that what he fears may happen to him can be withstood. The factors of personal control in the timing and quantity of the pain appear to be the important things here. This may explain why people enjoy drama and movies which frighten them or wring their heart-strings, why they ride on roller coasters at the amusement parks, and why some young men couldn't wait for the draft to catch up with them but were led to volunteer early in the war.

(d) The giving up of pleasure in one's own life, as illustrated in feminine masochism, brings with it the pleasure of participating in a passive-receptive way in someone else's omnipotence or greatness. Hence, the mother's willingness to sacrifice for her fabulous children.

Sigmund Freud attacked the problem of masochism in 1922 with the publication of his paper, "Beyond the Pleasure Principle." It is interesting to note parenthetically here that while his paper was written twenty-five years ago, some people still attempt to maintain that all of Freud's theories are "based on sex." This, of course, has not been true for a generation. On the basis of theoretical and clinical considerations, Freud theorized that there are two opposing forces motivating behavior—the death or self-destructive instinct on the one hand and the erotic or sexual instinct on the other. He pointed out that these are primary forces in the personality and did not attempt to explain their presence. Freud noted that both constructive and destructive urges are found in human behavior although they are seldom seen in pure culture in human thought or action. They are generally blended and mixed, which produces difficulties in clinical identification at times. He likened these forces to anabolism and katabolism in physiology and pointed out that love and hate are the emotional representatives of these urges.

TREATMENT

Although the purpose of this paper is primarily to describe and explain what is known of the masochistic urge in human behavior, it is fitting that a few words be said in closing with regard to the psychiatric treatment of such conditions. Inasmuch as masochism invariably contains an element of aggression, a desire for sacrifice, and an erotic satisfaction, psychotherapy directed to provide alternative and less destructive expressions for these elements is indicated.[8] Where masochism is found, it is therefore advisable to increase the socially acceptable opportunities for the expression of aggression. Competitive sports, exhausting physical effort, games which symbolize attack and defense, hunting, fishing, debating and the like may be found useful in such an effort. Secondly, it is desirable to increase the opportunity for atonement or sacrifice in a worthy cause. Church work, club work, political or organizational activities, social service, charities and the like, all offer such an opportunity. Thirdly, it is advisable to increase the investment of the individual in his love relationships or to find new objects for love. This can be accomplished most successfully by finding the natural inclinations, hobbies or attachments of the individual which somehow have been frustrated or inhibited in their full expression. If encouragement can be given to engage in association and activity with these outside love objects, some of the need for masochistic sacrifice may be diminished.

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Observations on the Treatment of Recurring Convulsions (Epilepsy) Occurring Among Children

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THE treatment of recurring convulsions (epilepsy) is a difficult problem since there are many variables, and treatment must take place over a long period of time. The etiology of such convulsions is, of course, extremely important but in the majority of cases this cannot be determined with accuracy and one is forced to treat the symptom without being certain what the underlying pathologic disturbance is. Even when the latter is recognized, it is frequently impossible to remove or alter the fundamental abnormality and treatment must again be directed toward the symptom.

It is essential that mental hygiene be considered in the treatment of epileptic patients. In certain cases emotional and mental stresses may well be precipitating factors in the attack. Repeated discussions with parents or other members of the family may reveal that the patient has conflicts and anxieties, not otherwise noted and tensions may be relieved with much benefit to the child. A tactful social worker or a schoolteacher who is in close contact with the family may be of great help.

It is often questionable whether a child who has convulsions can or should go to school. The decision will, of course, depend to some extent on the frequency and severity of the attacks. If the attacks occur rarely or are well controlled by drugs or diet, attendance of an ordinary school is advisable. If the attacks occur more frequently or are severe, it is better to have the child attend a special school or a public institution for epileptics. However, his education should proceed as nearly normally as possible and his social environment and activities should be, as nearly as possible, those of the child who does not have convulsions.

While perhaps not all workers will agree, it is widely considered at the present time that an epileptiform attack is due to an "explosion" of abnormal impulses in some portion of the brain, causing disorderly responses in the body, frequently accompanied by loss of consciousness. This presupposes an abnormal irritability of a portion or portions of the brain. Most forms of treatment have been directed toward reducing this increased irritability and the resulting "explosion" and drugs which have a sedative or anticonvulsant action have been used most frequently. The object of treatment is the complete prevention of seizures, with as little interference as possible with mental and emotional development, as well as physical activity.

One of the earlier and more successful of the drugs used in this manner was bromide. Lacock reported its use as early as 1853. The next effective drug to be used was phenobarbital which was used first in 1912. This is now rather well known and widely used. Later, methyl ethyl phenobarbital (mebaral), a methyl compound and a near relative of phenobarbital, was introduced. In 1938 Merritt and Putnam[1] advised the administration of diphenylhydantoin sodium (dilantin sodium). These four drugs may be used singly or in combination.

Most physicians rely on these few drugs for therapeutic effect, although many other drugs have been tried. In addition, at the Mayo Clinic, we have used the ketogenic (high-fat, low-carbohydrate) diet since 1921 and I wish to report some of the results of this treatment of patients who have been observed for many years. It is an effective treatment for children but not very effective for treatment of adults.

PRESENT STUDIES

In an attempt to compare the results of treatment with drugs and ketogenic diet, 300 consecutive cases in which the patients were first examined in 1940 and 1941 were studied. The patients were all fourteen years of age or less when they were examined at the clinic the first time. The results were classified as follows: Patients who had no attacks of any kind so far as they knew from the beginning of treatment or shortly thereafter until the end of the follow-up period (between four and five years) were considered to be well. Patients whose condition was definitely improved either for a comparatively short time or for a much longer time but who still had some difficulty were considered to be improved, and the remainder who continued to have attacks in spite of reasonable treatment were considered to have received no benefit.

Follow-up information was not obtained from 113 patients. Of the remaining 187, thirty-eight had gross neurologic disorders, such as cerebral palsy, marked mental retardation and so forth. Seventeen of these thirty-eight patients improved as far as their attacks were concerned; eight of them improved on treatment with phenobarbital alone; four improved when dilantin sodium was used; three, when a combination of the two was used, and one improved as the result of use of the ketogenic diet. One patient became well without any treatment and remained so for four years. Two children in this group died during treatment, one from general paresis and one from rather severe hydrocephalus.

One hundred forty-nine of the patients had no handicap but the convulsions and were treated for four to five years. Some of these 149 patients were treated by more than one method at different times. This makes the total number of patients who received the various types of treatment more than 149. In the remarks concerning treatment when I refer to use of only one type of treatment I mean that that was the only treatment given at the time.

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Thirty-seven of the 149 patients received ketogenic diet only. Of these thirty-seven, ten (27 per cent) were completely well, sixteen (43.2 per cent) were improved and eleven (29.7 per cent) were not benefited. A group of fifteen patients received ketogenic diet plus drugs. Again, four (26.7 per cent) were well, three (20 per cent) were improved and eight (53.3 per cent) were not helped. The ketogenic diet was maintained until the patient had been free of attacks for one year or more; then the diet was changed gradually to a normal diet containing usually a moderately limited amount of carbohydrate. When drugs were used in addition to the diet, their use usually was continued after the change in diet had been made.

Forty-eight patients received phenobarbital alone. Of these, six (12.5 per cent) were well, but continued to take full doses of medication. Thirty-one (64.6 per cent) improved for periods varying from a few months to four years.

Fifty patients received dilantin sodium alone. Six (12 per cent) remained well while taking the drug, nineteen (38 per cent) were improved, and twenty-five (50 per cent) obtained no help. It is interesting to note that twelve patients (24 per cent) of this group had toxic reactions and this was the only group in which evidence of toxicity was found.

A final group of twenty-six patients received both phenobarbital and dilantin sodium. Three patients (11.5 per cent) were well while taking medication consistently, twelve patients (46.2 per cent) were improved and eleven (42.3 per cent) were not improved.

A further group of cases studied consisted of all those in which treatment with the ketogenic diet alone or with drugs was started between 1921 and 1930. The records were studied through 1945. This group consisted of 311 cases. Seventy-three of the patients did not co-operate well enough to allow us to determine the therapeutic effect of the diet; forty-eight had gross neurologic lesions, including one brain tumor. As far as could be determined 190 patients gave the diet a fair trial. Sixty-seven patients (35.3 per cent) remained well after this treatment for periods of from four to twenty-two years. Thirty-five patients (18.4 per cent) were definitely improved, so much so that they were willing to continue the diet for several years.

Thus, by means of a ketogenic diet 53.7 per cent of the patients treated who had so-called idiopathic epilepsy were influenced favorably and 35.3 per cent have been well for long periods (four to twenty-two years).

The inheritance of epilepsy is a subject upon which much has been written. It is not within the scope of this paper to discuss the arguments. Penfield and Erickson[2] stated that "the conclusion cannot be avoided that some potential or latent germ plasm defect or vulnerability is inherited." In this connection it is of interest and perhaps of value to point out that twenty-nine children were born to twenty of the 190 patients who were followed up. The ages of the twenty-nine children ranged from a few months to twelve years at the time this study was made. Not one of these children had been observed to have convulsions of any sort.

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FELLOWSHIPS AVAILABLE THROUGH NATIONAL RESEARCH COUNCIL

Fellowships in the medical sciences, available through the Medical Fellowship Board of the National Research Council for 1948-1949 include the following. 1. Fellowships supported by grants from the Rockefeller Foundation and designed to provide training and experience in research in all branches of medical science are open to citizens of the United States or Canada who possess an M.D. or Ph.D. degree. They are intended for recent graduates who are not yet professionally established. 2. Two groups of research fellowships are available through a grant from the National Foundation for Infantile Paralysis. The first group, open to applicants who hold either the Ph.D. or M.D. degree, provides opportunities for special training and experience in the study of virus diseases; the second group, open only to graduates in medicine who have completed one or more years of hospital experience in clinical surgery and are planning a career in orthopedic surgery, offers opportunities for training and research in basic medical sciences of particular value in furthering progress in orthopedic surgery. 3. Fellowships in anesthesiology established through a grant from the American Society of Anesthesiologists are offered to foster a closer union between the clinical practice of anesthesiology and the fundamental disciplines on which anesthesia rests. Applicants must have an M.D. degree and must have completed one or more years of hospital experience as intern or resident.

The Medical Fellowship Board of the National Research Council has also under its jurisdiction a number of fellowships of senior grade in internal medicine (Welch Fellowships), epidemiology, clinical neurology, orthopedic surgery, pediatrics and virus diseases, for persons of proved research ability. Fellows will be appointed at a meeting of the Medical Fellowship Board early in March 1948. Applications must be filed on or before January 1. Appointments may begin on any date determined by the Board. For further details, address the Secretary, Medical Fellowship Board, National Research Council, 2101 Constitution Ave. N. W., Washington 25, D. C.—*J.A.M.A.*, Nov. 15, 1947.

Glucuronic Acid Deficiency in the Rheumatic Diseases

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GLUCURONIC acid is an important constituent of all fibrous tissue structures in the body. It takes part in the formation of cartilage, tendon, fascia, joint capsule, periosteum, bone, nerve sheaths, blood vessel walls, intercellular cement substances, mucus, joint fluid, and all connective tissues. These are the structures primarily affected in the rheumatic diseases.

Glucuronic acid is not only used as a unit of tissue structure, but it is also used extensively by the liver as a detoxicating agent. A very large number of both endogenous and exogenous poisons are rendered harmless by conjugation with glucuronic acid and eliminated with the urine. Tollens and Stern[7] found the daily output of glucuronic acid to average between 350 and 370 milligrams.

The double role which glucuronic acid plays in metabolism raises the question of its relationship to the deterioration of cartilage, tendons, fascia and fibrous tissue generally, as manifested in the rheumatic diseases. The harmful effects of toxicity from focal infections or from any source whatsoever are well known in these individuals and suggests some defect in the detoxicating mechanism.

No work has yet been reported on the problem of glucuronic acid deficiency. Such studies have been impossible because animals do not lend themselves well to this purpose and because commercial glucuronic acid has not been available in sufficient quantities. No way has yet been found to produce an artificial glucuronic acid deficiency in animals for investigational purposes and so in order to study the problem the investigator must carry on such work with volunteers in whom the possibility of a deficiency exists. The very nature of the problem requires a good supply of commercial glucuronic acid over a long period of time.

While volunteers for this work are plentiful, the supply of glucuronic acid has been difficult. When the decision was made in 1936 to make these studies it was felt that enough glucuronic acid could be prepared in our own laboratories from gum arabic or other plant sources to meet the need. While the yield from gum arabic was never more than one per cent, enough material was produced to carry on toxicity tests in animals and to conduct a therapeutic test in one volunteer for several months. Encouraged by the results obtained, efforts were put forth to find a better source of glucuronic acid. This was finally accomplished in the preparation of glucuronic acid from dextrose. The small yield obtained at first was gradually increased until enough material was prepared to make possible these preliminary studies. This report on the observations is made in the hope of attracting others to this very fertile field of research.

HISTORICAL DATA

The discovery of glucuronic acid was first reported by M. Jaffe[1] in 1878. Schmiedeberg and Meyer[2] working independently of Jaffe reported their discovery of glucuronic acid in 1879. In 1891 Fischer and Piloty[3] verified its existence and showed without a doubt that it was a direct oxidation product of grape sugar. In 1900 Mayer and Neuberg[4] demonstrated the presence of glucuronic acid in the urine and a year later Mayer[5] reported the finding of glucuronic acid in the blood of man and cattle. In 1900 Cammidge[6] reported an increased urinary output of glucuronic acid in patients with scarlet fever, smallpox, measles, pneumonia, chronic bronchitis and inflammatory disease of the pancreas. Tollens and Stern[7] found that the acid did not occur in the urine in the free state, but was conjugated with various aromatic substances formed in the intestine as a result of putrefactive clearage of proteins. By 1910 many observers were demonstrating the striking way in which glucuronic acid was used by the body to protect itself from deleterious substances, as shown by the abundant excretion of compound glucuronates that followed the administration of certain drugs. These included chloral hydrate, camphor, borneol, naphthol, aniline, benzine, turpentine, phenol, bromol, menthol, antipyrin and many others. Numerous studies by Jaffe, Neuberg, Fromm, Hildebrandt, Neubauer, Salkowski and many others showed that many foreign substances when introduced into the body were finally excreted with the urine in the form of conjugate glucuronic acids. Aldehydes and acetones were first reduced to alcohols. Hydrocarbons of the aromatic and hydro-aromatic series were hydrolized (as benzol to phenol) and heterocyclic compounds underwent analogous hydroxylation (as indol into indoxyl) before they were conjugated with glucuronic acid and eliminated.

ORIGIN OF BODY GLUCURONIC ACID

The exact mechanism of glucuronic acid formation in the body has not been definitely proven. Whether the formation takes place in the liver, the muscles or somewhere else is not known. However, the liver and the muscles are the more likely places as they have a rich supply of carbohydrate from which to synthesize it. The preferred precursor of glucuronic acid is probably gycogen. It is postulated that the oxidation of glucose to the acid probably takes place at a time when the aldehyde group of the molecule is protected in a glucoside linkage, as in glycogen. Experiments conducted by Quick[8] "seem to indicate that glycogen rather than ordinary glucose is the source of glucuronic acid and that when this supply is insufficient the organism can synthesize glucuronic acid more readily from protein than from ordinary alpha and beta glucose."

THEORETICAL CONSIDERATIONS

The deleterious effects of focal infections and toxicity in general in the rheumatic individual seem to indicate some defect in the detoxication mechanism. Deterioration of the body tissues which contain glucuronic acid, a substance which is also used as a detoxicating agent by the body, seems to point to some disturbance in glucuronic acid metabolism. The most logical assumption is that of a simple deficiency.

An insufficient production of glucuronic acid to meet the optimum daily requirements would very readily explain the imbalance between the anabolism and the catabolism of fibrous tissue as manifested in the rheumatic diseases. Not only would the necessary glucuronic acid be insufficient to rebuild the fibrous tissue used up by normal wear, but it would also be lacking to meet the necessary daily detoxicating requirements.

It is assumed that in this situation any increased demand for glucuronic acid for detoxicating purposes would be met by calling upon the body stores. To meet the emergency, either acute or chronic, the enzymatic action of glucuronidase would mobilize sufficient glucuronic acid from the tissues to prevent the intoxication from overwhelming the individual. Thus we might consider many of the clinical signs and symptoms of rheumatic disease to be the manifestations of an acute or chronic glucuronic acid deficiency associated with one of nature's many protective mechanisms.

TOXICITY TESTS

The calcium, sodium and potassium salts of glucuronic acid were prepared in distilled water so that each 100 cc. contained 10 gm. of available glucuronic acid as determined by the naphthoresorcinol colorimetric method, using borneol glucuronate as a standard. It was not anticipated that these preparations would cause any toxic symptoms in dogs when fed at the rate of three grams of available glucuronic acid per day, and this prediction was borne out after fourteen consecutive days of feeding. The solutions were then pasteurized at 80° C. for one hour and 10 cc. were injected subcutaneously daily for an additional seven days. No toxic symptoms were noted in any of the three dogs after twenty-one days of testing. These observations coincide with those of Mayer[9] who gave 10 grams of sodium glucuronate to rabbits and recovered the oxidation products in the urine. Miller, Siehrs, and Brazda[10] fed glucuronic acid to guinea pigs and found that they gained weight faster than the controls.

To obtain further information on the possible toxicity, one human volunteer, who worked in the laboratory, a male, aged 44, weighing 198 pounds, with normal physical, blood and urinary findings, was started on one gram of available glucuronic acid daily. It was taken by mouth in divided doses of one-third gram each. Since no untoward symptoms were noted after fourteen days the daily intake was increased to 3 grams. On the second day the volunteer noted a moderate flushing warmth of the skin and a slight headache with a tendency to euphoria similar to that produced in him by a glass of wine. That night he was restless and unable to sleep as usual. After lying awake until 3 o'clock in the morning, which was nine hours after the last gram of sodium glucuronate was taken, he began a restless, dreamy sleep which lasted four hours. He reported for work that day as usual with no after effects. The daily intake was then reduced to 1 gram and he has remained on that daily amount continuously for three years with only an occasional few days intermission due to lack of material. Sodium glucuronate was used with the exception of one three-month period when calcium glucuronate was used and one three-month period when potassium glucuronate was used. No essential differences were noted between the salts. No untoward results have yet appeared. On the contrary, the volunteer states that his general health has improved noticeably in the past three years, with a gain of twenty-three pounds in weight. His physical examination, blood and urinary findings remain normal.

OBSERVATIONS

The first patient, a white male, sales manager, aged 43, volunteered to take sodium glucuronate in September 1944. He had developed typical rheumatoid arthritis eight years previously and had undergone various types of treatment with several clinics and private physicians, none of which succeeded in bringing about a complete remission. Most of the time for the past three years he had been able to get about unaided, but at times he required a cane and at other times was completely incapacitated with pain, swelling of the joints, soreness and stiffness. At the time he volunteered for the sodium glucuronate regimen he presented a more or less subacute phase of a recurring rheumatoid arthritis with slight swelling at the ankles. His complexion was sallow and his hands showed the typical rheumatoid deformities. He stated that since the onset of the disease his hands and feet had always been very moist with a cold, clammy perspiration which had been very annoying. His blood pressure, heart and lungs were normal. The tonsils had been removed in 1929. He wore upper and lower dentures. The blood count, blood serology, sedimentation rate and urine examination were all within normal limits.

He was given one-third gram of sodium glucuronate in a 10 per cent aqueous solution three times daily by mouth. He has continued to receive this same amount daily with only an occasional few days intermission up to the present time. This patient reported that on the fourth day he noted that the cold, clammy perspiration of the hands and feet which he had had for eight years had disappeared entirely and that the cold sensations in the hands and feet were greatly improved. By the end of the first month of treatment the coldness of the upper and lower extremities had entirely disappeared and his hands showed a healthy, pink circulation. The body soreness was greatly reduced and his joints moved more freely. His general strength had increased and he was able to stand more exertion before becoming exhausted. He has enjoyed a sustained improvement now for 34 months. Encouraged by these results, it was decided to extend the observations to more volunteers with possible glucuronic acid deficiency. To date, 52 patients have been given the calcium, potassium or sodium salts of glucuronic acid.

Out of thirteen patients with typical rheumatoid arthritis, nine showed a very satisfactory response to the glucuronate treatment. Four of the thirteen were classed as not responding inasmuch as the improvement was not sufficient to definitely attribute it to the glucuronates.

All thirteen cases of fibrositis showed a very satisfactory response.

Five cases of typical hypertrophic arthritis were treated. Four showed satisfactory improvement while one did not.

Seven out of eight patients with mixed arthritis showed a very satisfactory response while one patient failed to improve enough to be classed as satisfactory.

Seven children who had failed to completely recover from rheumatic fever were successfully treated with the salts of glucuronic acid. All the mothers of the children in this group reported a decided improvement by the end of the first week of treatment.

Two patients with diabetic polyneuritis were included in the series and both made a prompt response to the glucuronate treatment.

One patient with acute sciatic neuralgia of six weeks duration improved progressively and was symptom-free in four weeks.

One 35 year old male with painful hemophilic arthritis became free of pain in five days. The edema of the ankles and swelling about the knees cleared completely in two weeks. His general condition improved greatly during the twelve months under observation, but his blood picture remained unchanged.

One patient with multiple sclerosis failed to show any response to the glucuronate treatment.

One patient with neurasthenia had an aggravation of her nervous symptoms on two different attempts to use the glucuronate treatment.

Summary and Conclusions

Of the eight cases who failed to show improvement, four were rheumatoid arthritis, one hypertrophic arthritis, one mixed arthritis, one multiple sclerosis and one neurasthenia.

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William A. O'Brien, M. D.

1893-1947

Rarely does one have the privilege of acquaintance with a personality so unique as that of Dr. O'Brien. His sudden death last weekend causes a sense of great personal loss not only to those of us who were his intimate friends but also thousands of people in our state and nation who know him only by name.

"Bill" O'Brien, or "O B", as most of us knew him, was graduated from St. Louis University Medical School in 1914 at the age of 21. He engaged in the private practice of medicine in Detroit, Michigan, for two years before and two years after World War I. During this war he served as a medical officer in the U. S. Army.

Dr. O'Brien first came to Minnesota in 1921 for the express purpose of taking most of the medical course over again, saying that he wanted to know more before going on with practice. Last Saturday he passed away, one of the most widely known and beloved citizens of this state.

The positions which Dr. O'Brien occupied and the roles he played have no counterpart here or elsewhere. They were developed by and for him and were identified with his personality.

His early years on the staff of our Medical School were spent as an instructor in pathology. Here it soon became obvious that he was a born teacher—that he could command and hold the interest of students and make the difficult easy.

His next position was as pathologist at the University Hospital and director of the course in medical technology. The conferences which he started while pathologist at the hospital were later expanded into the weekly general staff meetings, which bring us together here today. His broad and sincere interest in all fields of medicine and his warm and genial personality as presiding officer have been major factors in the continued success of these meetings. He was responsible, too, for the development of the weekly Staff Bulletin which today goes not only to the current members of the hospital staff but also to hundreds of former house officers and alumni of the Medical School.

Under Dr. O'Brien's leadership the course in medical technology gained a national reputation and, I am sure that every graduate of this course felt a personal debt of gratitude and affection for Dr. O'Brien.

It was also during his period of service as hospital pathologist that Dr. O'Brien inaugurated the popular Orientation Clinics for freshman and sophomore medical students. He was a master at this type of teaching and his interest and participation in these clinics never waned.

In more recent years, Dr. O'Brien's official position has been Professor of Public Health and Director of Postgraduate Medical Education. In this latter capacity he developed a unique program of continuation study courses for physicians and allied groups working in the broad fields of medicine and health. This program, which was supported first by the Commonwealth Fund of New York and more recently by the Kellogg Foundation of Michigan, has received national recognition and has made an important contribution to better medical and health services in the Upper Midwest.

Through these activities Dr. O'Brien was known and beloved by the medical and allied professions. But the general public learned to know him, to enjoy him, and to believe in him through his radio health talks over a period of almost twenty years; through the classes that he taught to thousands of University students; through his many public talks and addresses and in recent years through his widely syndicated health column. As a master of ceremonies and as an after dinner speaker Dr. O'Brien was always in demand. Yet he never failed to interest his audience or to leave them with a worthwhile message.

He was a leader, also, and a wise counselor to many voluntary health organizations. Of these the Minnesota Cancer Society, of which he has been president for some years, was probably his major interest. He felt that the public must be made to understand what scientists now know about cancer and to appreciate the necessity of liberal support for further research on this and other diseases.

Dr. O'Brien was a person of great human warmth, who radiated a source of well being and good cheer. He was a genial friend who inspired confidence in all who came within his sphere, and an inspired teacher who had a profound affection for all mankind.

Dr. O'Brien loved people and was a man of vast acquaintance. Few have been privileged to know personally so many people throughout the state and few have cherished these friendships so deeply. Apart from his family, they were his most prized possessions. He also knew human nature and had a singularly broad understanding of young and old alike.

Through his many activities Dr. O'Brien touched the lives and contributed to the better health of countless grateful people—people who are saddened by his passing but who will remember him with warm affection and with the feeling that their lives are better and richer for having known him. Of him the following verse might well have been written:

When a star is quenched on high,
For ages will its light
Still travel downward from the sky,
Shine on our mortal sight.
So, when a good man dies,
For years beyond our ken
The light he leaves behind him lies
Upon the path of men.[*]

HAROLD S. DIEHL, M.D.
Dean, University of Minnesota Medical School

November 21, 1947.

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[*] "In Memoriam," *J.A.M.A.*, 116:2693, June 14, 1941.

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Editorials

NOBEL PRIZE WINNERS IN MEDICINE

Dr. Carl F. Cori and his wife, Dr. Gerty T. Cori, have recently been announced as the 1947 Nobel prize winners in Medicine. The Coris, faculty members at Washington University, St. Louis, Missouri, received their half of the prize for work in crystallizing and isolating enzymes, which start the burning of sugar in the body.

Dr. Bernardo Alberto Houssay was awarded the other half for research of the foremost lobe of the pituitary gland and its importance for distributing of glycogene matter in the body.

As we saw the pictures of the recipients of these honors, three things came to mind. We believe we are quoting Halliday Sutherland correctly from his delightful book, *Arches of the Years,* published about fifteen years ago, "Simplicity, the only attribute of mind common to genius and fools," and feel sure that no one will misunderstand it in this connection. It was particularly delightful to see the Doctors Cori snapped in their workaday laboratory coats. They are two wonderful persons with suitability of mind and purpose, joined in the same life interest. No affectation, no overdone press-photography—just a simple, becoming modesty, fulfilling Osler's suggestion that, "A due humility should take the place of honor on the list."

Thirdly, we are reminded of an incident with Dr. Will Mayo in the tower of his house at Rochester some years ago. In response to a question, "Where do you get away from the daily grind for a little rest?" he said, "Come and I'll show you." We ascended a ladder which he pulled up after us by a rope. "Here we are quite alone and by ourselves." He pointed out towns that could be seen on this clear day and indicated their almost unbelievable distances away. He said that the Mayo family came from Lancashire, England. He usually wore a blue serge business suit and up to that time had not possessed an evening suit, explaining that "Charley and I are working men."

We realize that when the Mayos received honors in later years they quietly conformed with the dress prescribed for these ceremonies. We also understand that when the Coris are presented to King Gustaf in Stockholm, Sweden, they will adapt themselves to the conventions of court etiquette, but their laurels were earned in simple working clothes. A. E. H.

RESEARCH IN TUBERCULOSIS

Research in tuberculosis is aimed at control of the disease through prevention or cure. There is no simple shortcut, however, to these objectives. In a number of diseases, happy circumstance, through the discovery of an antitoxin or a drug with a sterilizing effect on the germ causing the disease, has enabled control of the infection. In the majority of diseases, such a shortcut has not been discovered. Among these is tuberculosis.

So much research has been done upon this disease that it is unlikely that a preventive or cure will be discovered suddenly. For this reason, research is directed toward fundamental aspects of the disease that may enable control finally through long and well thought-out enterprise.

The Committee on Medical Research of the National Tuberculosis Association has long been concerned with fundamental laboratory investigations throwing light upon the intimate nature of the tubercle bacillus and the physiological processes by which it lives. At the same time, the committee has sponsored clinical investigations which furnish better understanding of the progress and prognosis of different forms of tuberculosis and related conditions which sometimes offer difficulty in diagnosis.

This research is financed by funds raised in the annual Christmas Seal Sale of the National Tuberculosis Association and its 3,000 affiliated associations.

Only five per cent of the funds raised through the sale of Christmas Seals in each state goes to the National Association for its research and other activities. Ninety-five per cent of the Seal Sale funds remains in each state to finance local and state-wide programs, including tuberculin testing and X-ray surveys, a broad program of health education and other activities. Through these fundamental investigations, results of great practical value may be expected for the welfare of each individual who has tuberculosis or is exposed to this disease.

The investigations are often of a highly technical nature and, because of their complexity, proceed slowly. A large group of studies sponsored for many years by the National Tuberculosis Association is concerned with chemical analyses of the different elements entering into the composition of the tubercle bacillus and the medium on which it has grown. These investigations have given us a remarkable understanding of the exact nature of the bacillus. At the same time, they have permitted the production of useful pure substances, such as the purified tuberculin now widely used in surveys of school and other large population groups.

The chief reason for their continuation, however, is the hope that vulnerable points will be discovered in the life processes of the tubercle bacillus, which will enable trained investigators to suggest means of interposing obstacles either to the essential life processes of the germ or to its synthesis of new materials for its body structure. Such investigations are intimately tied with research on the manner in which drugs as streptomycin act.

Among the clinical and epidemiological studies sponsored by the National Tuberculosis Association, on the recommendation of its Committee on Medical Research, two may be cited as of unusual interest in indicating the objectives of research on these aspects of the disease.

One of these, a cooperative enterprise with the United States Public Health Service, is directed toward an exact determination of the course and prognosis of tuberculosis when it is discovered in the minimal stage. It must be assumed that, in general, advanced and fatal tuberculosis was at one time tuberculosis of minimal extent.

It is well known that many cases of minimal extent

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heal easily and spontaneously with little care. Others progress to a fatal issue. The reason why many cases of minimal tuberculosis go on to the advanced and often hopeless state is not as clear as might be supposed. The current large study, based on many thousands of cases, is expected to yield valuable information on this most important point.

The other clinical study has to do with the course of tuberculosis in childhood. Childhood tuberculosis, fortunately, is rapidly coming under control. Yet the fact remains that many children still acquire lesions early in life. These may be a menace to future health through the establishment of latent foci which remain dormant for years and ultimately progress to disease in adult life.

Exact investigation of the relation of progression of the disease in childhood to the age of the child, time of first infection, type of care given, nutritional state of the child and other factors, is yielding information which should be of great importance in determining what are the best means for protection.

In addition, the Committee on Medical Research of the National Tuberculosis Association has taken a prominent part in the promotion of the current promising investigations on streptomycin and other antibacterial drugs which may be useful in the treatment of tuberculosis. Information on this large and important subject will appear from time to time in publications of the National Tuberculosis Association.

These few examples from the long list of projects sponsored by the National Tuberculosis Association through its Committee on Medical Research serve to illustrate the breadth and scope of research and the ultimate aims.

Esmond R. Long, M.D.,
Director, Division of Research,
National Tuberculosis Association

American Student Health Association

Eugenia C. Jones, M.D., has been employed as Director of Student Health at Agnes Scott College, Decatur, Georgia, to replace Margaret V. Burns, M.D.

Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, is in urgent need of another doctor in their Health Service. They would prefer a young or middle-aged man who is qualified in general practice. J. Oscar Thomson, M.D., is Director of Student Health Service.

The University of New Hampshire, Durham, New Hampshire, is looking for an assistant physician in their Department of Student Health. Walter E. Batchelder, M.D., is the Director of Student Health in this institution.

A. Francis MacDougall, M.D., of Westford, Massachusetts, has been engaged as Assistant to the Director of the Student Health Service at the University of New Hampshire, Durham, New Hampshire.

Ralph I. Canuteson, M.D., Director of Student Health at the University of Kansas, Lawrence, Kansas, has a vacancy for a male physician on his staff. The remuneration is $415.00 per month.

Dr. A. O. DeWeese, Director of the Student Health Service, Kent State University, Kent, Ohio, is looking for a woman physician, preferably under thirty-five years of age, as resident physician. He is offering $4500.00 a year with one month's vacation. Living quarters are furnished without expense.

The Student Health Service of the State College of Washington has a vacancy for a physician who preferably has had a two years residency in any of the following fields, Orthopedics, Surgery, Internal Medicine, Gynecology, or Psychiatry. The remuneration for this position is $6,000.00 for eleven months service. Applicants should correspond with Jesse A. Riser, Administrator, The State College of Washington, Pullman, Washington.

Dr. Dan G. Stine writes that he has an opening on his staff for two assistant physicians, men, at salaries from $4500.00 to $5500.00, depending upon the amount of training and experience. Dr. Stine is Director of Student Health, University of Missouri, Columbia, Missouri.

Dr. John W. Brown, Professor of Preventive Medicine and Director of the Department of Student Health at the University of Wisconsin, Madison 6, Wisconsin, writes that his Department which is a division of the University of Wisconsin Medical School under the Department of Preventive Medicine, has vacancies for additional physicians.

A MEMORIAL TO DR. O'BRIEN

Since Dr. O'Brien's death many of these friends have suggested that in appreciation of what he meant to them they would like to contribute toward a memorial in his honor. In response to these suggestions, Dr. Harold S. Diehl, Dean of Medical Sciences at the University, appointed a special committee, under the chairmanship of Mr. Ray M. Amberg, Superintendent of the University Hospitals, to consider an appropriate memorial. This committee proposes that adequate facilities be provided in the new medical center for the continuation study programs in medical and health fields which Dr. O'Brien developed. These programs were Dr. O'Brien's primary interest because they contribute so directly to better health and better medical care; they reach down into every home and community in the state.

This memorial will perpetuate the memory of Dr. O'Brien, and insure continuation of the work in which he pioneered.

Contributions toward this memorial may be sent to the University of Minnesota for the William A. O'rBien Memorial Fund. The names of contributors will be made a matter of record and sent to the family.

U.HOLZER
BINDER